

Handbooks for the Identification of British Insects

Volume 9 Part 8

Fungus gnats

(Diptera: Mycetophilidae:
Mycetophilinae)

Peter J. Chandler



**Royal
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Society**

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Abstract

This handbook covers the British species of the subfamily Mycetophilinae of family Mycetophilidae, commonly known as the fungus gnats. Most fungus gnats are found in forests and other wooded habitats, as might be expected since the larval development of many species is dependent on saproxylic or mycorrhizal fungi. Fungus gnats may be found throughout the year, their relative abundance affected by prevailing weather conditions and the consequent effect on the availability of fungus hosts. While there is a range of larval habitats among fungus gnats as a whole, members of subfamily Mycetophilinae appear to be exclusively mycophagous; about half the British species of this subfamily have been reared and a systematic list of the known fungus hosts is provided.

In the British fauna, fungus gnats comprise 574 species in five families: Bolitophilidae, Diadocidiidae, Ditomyiidae, Keroplatidae and Mycetophilidae, with the majority (501 species) in Mycetophilidae. How to recognise fungus gnats from other Diptera and how to distinguish these five families are described. An earlier handbook (Hutson *et al.* 1980) covered all except the largest subfamily Mycetophilinae, which is treated here. Keys are provided to the subfamilies of Mycetophilidae and to the 27 genera and 334 species in the British fauna of subfamily Mycetophilinae. Recognition of species depends on the complex structure of their male genitalia, which are illustrated by photographs for all species. Females are not identifiable in some genera; where there are characters that enable them to be identified, this is indicated. Three species are newly added to the British list: *Brevicornu canadense* Zaitzev, 1988 (previously recorded as an unnamed species near *B. arcticum*), *Trichonta subterminalis* Zaitzev & Menzel, 1996 and an unnamed species of *Cordyla*, while the British Isles species previously identified as *Brevicornu arcticum* (Lundström, 1913) is now considered to be an undescribed species. These unnamed species are due to be formally described by other authors.

Acknowledgements

Growth in knowledge of the British fungus gnat fauna has depended on the numerous recorders who have provided specimens for examination over many years. I am grateful for all their efforts, in particular to those who have taken part in the many Dipterists Forum field meetings and to those who have contributed specimens from site surveys. The authorities of the museums housing historic fungus gnat collections have kindly enabled full access to these collections, and facilitated many loans of relevant material.

The staff of the Biological Records Centre assisted with the processing of data from the Fungus Gnat Recording Scheme. I thank Martin Harvey for overseeing this work and bringing it to fruition, and Stephanie Rorke for supplying the latest distribution maps of all species, including those shown here in Figures 2–9.

Most of the photographs of wings of subfamily Mycetophilinae were taken at the Natural History Museum, London by Erica McAlister and her colleagues, and I thank them for their efforts.

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Most of the photographs of whole insects, wings of *Exechia macula*, *Zygomyia pictipennis* and of other families and subfamilies, larvae and most of those of genitalia were taken by Janet Graham; the genitalia photographs were mostly from preparations made by her brother Andrew. Many of their photographs are of their own specimens; they have since 2017 augmented this with specimens supplied by myself. All of their photographs are also available on Janet's Flickr site: (<https://www.flickr.com/photos/149164524@N06/sets/>) at high resolution. I am grateful to them for the care taken with this.

I thank Chris Spilling for the habitus photograph of *Synplasta exclusa*. The photographs of habitus and wing of *Macrobrachius*, habitus of *Tarnania*, wing of *Eudicrana*, genitalia of *Sceptonia concolor* and gonostylus of *Brevicornu rosmellitum* were kindly supplied by Jostein Kjærandsen (The Arctic University of Norway, Tromsø). I also thank Jostein for providing a specimen of *B. rosmellitum*, from which other genitalia photographs of this species were taken by Janet Graham. I am grateful to Olavi Kurina (Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, Tartu, Estonia) for the genitalia photographs of *Mycetophila czizekii* and *M. idonea*, and for sending photographs of the genitalia of Estonian specimens of *Trichonta terminalis* and *T. subterminalis*. The latter assisted in recognition of these species, and I thank both Olavi and Jostein for helpful discussion of the *Trichonta terminalis* group.

The view of a live specimen of *Ditomyia fasciata* was taken by Judy Webb and previously appeared in Chandler (2010b). The wing figures of *Sylvicola* and *Mycetobia* are based on the figures in the handbook to Anisopodidae by Freeman (1950). Figures 14 and 16 of diagnostic characters of the head and thorax are from Søli (2017) and I thank Geir Søli and the South African National Biodiversity Institute for permission to include these.

Advice on nomenclature of fungi and assistance with respect to species of fungi not recorded in the British Isles was earlier provided by Brian Spooner. More recently such advice has been given by Richard Fortey. I thank them for their help.

I am grateful to Klaus-Uwe Gnaß of Schenefeld, Germany for enabling me to use his photograph of a mating pair of *Dynatosoma fuscicorne* as the cover illustration.

Helpful comments on near final drafts of the text were provided by Jostein Kjærandsen, Olavi Kurina, Jan Ševčík (Department of Biology and Ecology, University of Ostrava, Czech Republic) and Vladimir Blagoderov (National Museum of Scotland, Edinburgh). I am also indebted to Julie Locke for her careful checking of the introductory chapters and keys to genus level, which resulted in many improvements; her advice was greatly appreciated.

What are fungus gnats?

Fungus gnats belong to the large group of two-winged flies that comprise the Lower Diptera (often known as Nematocera). This group shares a range of primitive characters, of which the most obvious is their more or less elongate multi-segmented antennae. It includes the craneflies and mosquitoes, as well as several families that are variously termed as gnats and midges. While many other Lower Diptera are aquatic as larvae, fungus gnats belong among those families that are terrestrial in their developmental stages. They include species developing in rotten wood, in bryophytes, in bird's nests, in caves, and some have predatory web-spinning larvae, but the majority are mycophagous (= fungivorous) and develop in fungi.

Fungus gnats vary greatly in form, from slender to robust-bodied. In general, the thorax has a humped appearance, the legs are long and slender but with well-developed tibial spurs and often distinct tibial bristles, and the wings have a characteristic but diverse arrangement of veins (see Figs 17–20 and the Family Recognition section). They also vary widely in size, with a wing length ranging from 1.5 to 14 mm, but most are within the range 2.5 to 5.0 mm (only a few species in the subfamily Mycetophilinae treated here exceed that range, up to around 6.5 mm). As the body may contract in dry specimens and be extended in fluid, the wing length is the most constant dimension, and here the range for each genus is given in the summary of generic characters.

The coloration of fungus gnats is varied. Some are predominantly black-bodied like the allied Sciaridae (known as “black fungus gnats”), while others are mainly brown or yellow; most are partly dark-coloured with some paler markings. The legs are mainly yellow, sometimes with darker markings. The wings may be unmarked or with various patterns of brown markings.

Fungus gnats were formerly treated as a single family Mycetophilidae, but are now classified in several families of which five occur in the British Isles; the others are Bolitophilidae, Diadocidiidae, Ditomyiidae and Keroplatidae. Mycetophilidae still includes the majority of species, and its largest subfamily Mycetophilinae is the subject of the present handbook. The differences between these families, and from Sciaridae, are explained in the Family Recognition section.

Together with Sciaridae and Cecidomyiidae (gall midges), they are placed in a superfamily Sciaroidea, which is included in the infra-order Bibionomorpha, comprising a wider group of terrestrial families that also includes Bibionidae, Scatopsidae, Anisopodidae and Mycetobiidae.

How are they distinguished from other Lower Diptera?

Craneflies and their allies (the six families covered by Stubbs 2021) differ from fungus gnats and other Lower Diptera in the presence of a transverse suture on the dorsal surface of the thorax, in their usually more complex arrangement of wing veins and, except for the winter gnats (Trichoceridae), in the absence of ocelli (see Fig. 14) on the dorsal surface of the head.

Many other Lower Diptera, including moth flies (Psychodidae), mosquitoes (Culicidae) and the several families of midges with mainly aquatic larvae, also differ from fungus gnats in lacking ocelli, as do most of the gall midges (Cecidomyiidae, except for subfamily Lestremiinae).

Fungus gnats also differ from all Cecidomyiidae, and some other mainly terrestrial families such as Scatopsidae, in the possession of tibial spurs (see Fig. 21). Other families that share with fungus gnats and Sciaridae the possession of both ocelli and tibial spurs are the window gnats (Anisopodidae), wood gnats (Mycetobiidae) and St Mark's flies (Bibionidae).

Bibionidae differ in their antennae being inserted below the level of the compound eyes (they are inserted between the eyes in fungus gnats, see Figs 15 and 16), and the presence of pulvilli (a pair of pads below the claws on each leg). They are also usually more robust-bodied.

Anisopodidae is represented in Britain by five species of *Sylvicola*. They differ from fungus gnats in having (like many crane flies) a discal cell in the middle of the wing, as indicated in the figure of *Sylvicola punctatus*. Their wing veins also differ in the radial sector forking into two long veins (R_{2+3} and R_{4+5}) before the anterior crossvein (r-m), and in the presence of four separate median veins (M_1 , M_2 , M_3 and M_4).

Confusion with fungus gnats is most likely with Mycetobiidae (often treated as a subfamily of Anisopodidae and represented in the British Isles by three species of *Mycetobia*). They differ from *Sylvicola* in lacking the discal cell and having only three median veins (M_1 , M_2 and M_4), in common with fungus gnats. They agree with *Sylvicola* in the radial sector forking into two similar long veins (R_{2+3} and R_{4+5}) but are very distinctive in the base of this fork being at the junction with crossvein r-m. In fungus gnats a radial fork with R_{2+3} and R_{4+5} of similar length is only found in Ditomyiidae (see figure of *Symmerus* in Family Recognition section), where branching is always well beyond the junction with the crossvein r-m. Where R_{2+3} is present in some other fungus gnats it is much shorter than R_{4+5} (as in Figs 17-19); this vein is always absent in subfamily Mycetophilinae.

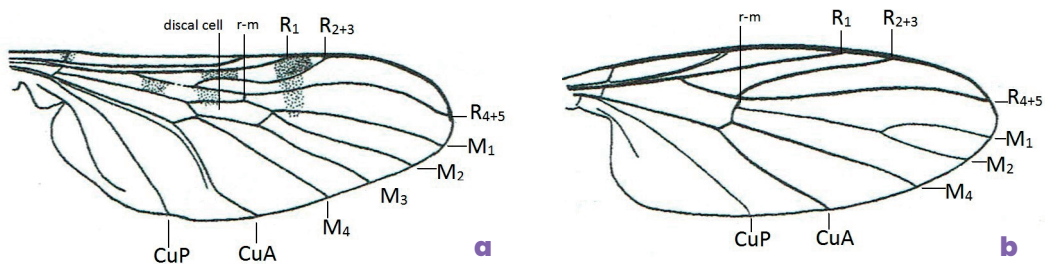


Figure 1. Wing of: (a) *Sylvicola punctatus* (Fabricius, 1787) (Anisopodidae), (b) *Mycetobia pallipes* Meigen, 1818 (Mycetobiidae).

Introduction

Hutson *et al.* (1980) provided a handbook to British fungus gnats, which included keys for all groups to subfamily level, and keys to species of all included taxa except for the largest major group, the subfamily Mycetophilinae. A free download of the full text of that handbook is available from the Royal Entomological Society website.

The higher classification of fungus gnats was not yet resolved at the time the handbook appeared and they followed previous British checklists in including all groups within the family Mycetophilidae. This arrangement followed the earlier revision by Edwards (1925), who recognised a number of subfamilies and tribes. The only change from Edwards' arrangement that was accepted by Hutson *et al.* was the exclusion of the family Sciaridae (which had been placed as a subfamily of Mycetophilidae by Edwards). The Sciaridae were treated separately in a handbook by Freeman (1983), but even then were poorly known and preparation of a revised handbook by Frank Menzel and Jane Smith began in 2001, leading to an interim update of the British sciarid fauna (Menzel *et al.* 2006).

Since 1980 it has become increasingly accepted that most of the subfamilies recognised by Edwards deserved family status within the superfamily Sciaroidea and this principle was followed in the British checklist (Chandler 1998b). There the families Bolitophilidae, Diadocidiidae, Dityomyiidae and Keroplatidae were treated separately from Mycetophilidae. In this arrangement the subfamily Macrocerinae of Edwards is included in Keroplatidae following the works of Matile, especially his monograph of that family (1990). The subfamilies Manotinae and Sciophilinae of Edwards are retained in Mycetophilidae, but subfamily status is given to the four tribes proposed within Sciophilinae by Edwards. The placement of some genera of Sciophilinae *sensu lato* was revised, including the recognition of a further subfamily Eudicraninae (*Eudicrana* only) following Väisänen (1984). This classification was adopted in the Fauna Europaea database (Chandler 2005a).

The British species of all of the above-mentioned groups were covered by Hutson *et al.* (1980), leaving only the Mycetophilinae, which are dealt with here. The composition of Mycetophilinae and the recognition of two tribes, Exechiini and Mycetophilini, remain unchanged from Edwards (1925). There is little doubt that this subfamily and its tribes are monophyletic (i.e. all members have a common ancestor not shared with any other taxonomic groups) but the status of other taxa within the restricted concept of Mycetophilidae is far from being resolved. Recent phylogenetic studies have suggested that Mycomyinae and Manotinae are also probably monophyletic, but have provided rather less support for monophyly of Gnoristinae, Leiinae and Sciophilinae *sensu stricto*, while *Eudicrana* has been returned to Sciophilinae by most authors. Some authors have continued to follow Edwards (1925) in maintaining tribal status for these taxa and in the placement of genera within them. Further work covering the entire range of genera, including those from the Southern Hemisphere, will be necessary to resolve these issues.

The generic classification within the tribe Mycetophilini has remained much the same as that proposed by Edwards (1925), most genera in that tribe being distinct, and having

been clearly characterised by Edwards. In Exechiini the present arrangement differs substantially from Edwards' work due to a generic revision by Tuomikoski (1966), who split most of the larger genera recognised by Edwards into two or more genera and subgenera. Tuomikoski's genera are clearly more natural groupings and have gained wide acceptance, and his classification has been further revised only by the raising of some of his subgenera to generic rank by subsequent authors. A further change that has taken place since the checklist (Chandler 1998b) is the raising to generic rank by Sæli *et al.* (2000) of two subgenera of *Allodiopsis* Tuomikoski, i.e. *Myrosia* Tuomikoski and *Notolepho* Tuomikoski, also accepted by Burdík *et al.* (2019) in their molecular analysis of the tribe Exechiini. Magnussen *et al.* (2021) have raised *Brachycampta* to generic rank

Before the present century, Edwards (1925) was the most recent work in English that covered a good proportion of the British species of Mycetophilinae. In 2003 the second volume of a monograph of the Russian fungus gnats by Alexander Zaitzev appeared as a volume of the journal *Dipterological Research*. The first volume of this monograph (Zaitzev 1994), which covered all groups dealt with by Hutson *et al.* (*op. cit.*) except the Manotinae, was published as a book with the text in Russian. A wider appeal was achieved for the second volume (Zaitzev 2003) by publishing it in English. This second volume therefore covers Manotinae and Mycetophilinae, including the majority of British species and is well illustrated with figures of the male genitalia of most included species. Chandler (2005b) reviewed this work in relation to its coverage of the British fauna and noted that at least 45 British species were not figured. To enable the identification of these additional species it was necessary to consult at least 20 other papers, but on the other hand the quality of Zaitzev's figures ensured that any species not included could be recognised as such.

The generic arrangement in Zaitzev (2003) agrees with the present work except that *Myrosia* and *Notolepho* are there placed as subgenera of *Allodiopsis* and *Brachycampta* as a subgenus of *Allodia*. It should also be noted that in Zaitzev's generic key *Allodiopsis* was evidently also taken to include *Synplasta*, to which he accorded generic status. It is consequently not possible to reach *Synplasta* in his text by using his generic key.

An update of the taxa covered by Hutson *et al.* (1980)

Most species can be identified effectively using the 1980 Handbook, which covered 203 native and one introduced species (*Leia arsona* Hutson, 1978), but there have since been 37 additions to the British list of those groups, most of which are still rarely recorded. In addition, a species originally keyed by Hutson *et al.* as *Docosia* "sp. indet." has since been described as *D. expectata* Laštovka & Ševčík, 2006 (Laštovka and Ševčík 2006). Also, a further introduced species of Neotropical origin, *Sciophila fractinervis* Edwards, 1940 has been recorded (Chandler 2010a). A list of the additional taxa is given here and references to their addition to the British list and identification are cited:

Handbooks for the Identification of British Insects: Fungus Gnats

BOLITOPHILIDAE

Bolitophila modesta Lackschewitz, 1937 (Chandler 1987)*Bolitophila nigrolineata* Landrock, 1912 (Chandler 1992)

DITOMYIIDAE

Symmerus nobilis Lackschewitz, 1937 (Chandler 1997, 2001)

KEROPLATIDAE

Macrorrhyncha hugoi Kjærandsen & Chandler, 2011 (first added as *rostrata* (Zetterstedt) by Chandler 1992; recognised as a distinct species by Kjærandsen and Chandler 2011)*Monocentrotta favonii* Chandler, 1987 (Chandler 1987)*Orfelia bicolor* (Macquart, 1826) (Chandler 1992)*Macrocera nigropicea* Lundström, 1906 (Chandler 1990)

MYCETOPHILIDAE

GNORISTINAE

Boletina gusakovae Zaitzev, 1994 (Blagoderov in Chandler 2020)*Boletina landrocki* Edwards, 1924 (Chandler 2006)*Boletina minuta* Polevoi in Zaitzev & Polevoi, 1995 (Chandler 2001)*Boletina populina* Polevoi in Zaitzev & Polevoi, 1995 (Chandler 1998a, 2001)*Creagdhubhia mallochorum* Chandler, 1998 (Chandler 1998c ♂ and 2006 ♀)*Ectrepesthoneura tori* Zaitzev & Økland, 1994 (Chandler 2006)*Grzegorzekia bushyae* Chandler, 2015 (Chandler 2015b)*Syntemna setigera* Lundström, 1914 (Chandler 2006)

LEIINAE

Clastobasis alternans (Winnertz, 1864) (Chandler 2001)*Docosia morionella* Mik, 1884 (Chandler 1987)*Greenomyia mongolica* Laštovka & Matile, 1974 (Chandler 2008a)*Leia longiseta* Barendrecht, 1938 (Chandler 1992a)

MYCOMYINAE

Mycomya (Coheromyia) branderi Väisänen, 1984 (Chandler 1992a)*Mycomya (Mycomya) bicolor* (Dziedzicki, 1885) (Chandler 2016)*Mycomya (Mycomya) danielae* Matile, 1972 (Chandler 2014)*Mycomya (Mycomya) denmax* Väisänen, 1979 (Chandler 1992a)*Mycomya (Mycomya) disa* Väisänen, 1984 (Chandler 2013)*Mycomya (Mycomya) occultans* (Winnertz, 1864) (Chandler 1992a)*Mycomya (Mycomyopsis) frequens* Johannsen, 1910 (Chandler 1992a)*Mycomya (Mycomyopsis) parudentata* Väisänen, 1984 (Coldwell 2004, Chandler 2006)*Mycomya (Mycomyopsis) permixta* Väisänen, 1984 (Chandler 1992a)*Neoempheria striata* (Meigen, 1818) (Chandler 1987)

SCIOPHILINAE

Phthinia mira (Ostroverkhova, 1977) (Chandler 1987; figured as a variety of *P. humilis* Winnertz by Hutson *et al.* 1980)

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Polylepta borealis Lundström, 1912 (Chandler 1992a)
Sciophila antiqua Chandler, 1987 (Chandler 1987)
Sciophila baltica Zaitzev, 1982 (Chandler 1998a, 2001)
Sciophila caesarea Chandler, 2001 (Chandler 2001)
Sciophila krysheni Polevoi, 2001 (Chandler 2006)
Sciophila parviareolata Santos Abreu, 1920 (Chandler 2001)
Sciophila salassea Matile, 1983 (Chandler 2006)

Checklist of British species of subfamily Mycetophilinae

The list follows the same format as the checklist of British Isles Diptera (Chandler 1998b), with references to changes which have occurred since the appearance of that list. Since 1998, 30 species of Mycetophilinae have been added to the British Isles list, and there have been nomenclatural changes affecting 14 other species. The species identified as *Brevicornu arcticum* by Chandler (1977a, 2018a) has since been discovered to be an undescribed species, while a related species thought to be new (Chandler 2013) has been identified as *B. canadense* (Jostein Kjærandsen *pers. comm.*). *Trichonta subterminalis* is added in the present work. In addition there is an unnamed species of *Cordyla*, bringing the total list to 334 species. As in the 1998 checklist, the original genus is given within parentheses for species that have changed their generic assignment.

Of the 334 species listed here, 191 have been recorded from Ireland (marked *); an assessment of Irish distribution is given in the individual species accounts. This Irish presence is a higher proportion than for the entire family Mycetophilidae or fungus gnats in general, for which there are Irish records of 302 species (269 Mycetophilidae and 33 of the other four families). Thanks to the efforts of Steven Crellin, 80 species of fungus gnats including 55 species of Mycetophilinae can now be recorded from the Isle of Man (marked †), of which all but three also occur in Ireland.

Valid names are in bold type, while synonyms and misidentified names are inset.

Tribe Exechiini

ALLODIA Winnertz, 1864 *Status amended
by Magnussen et al. (2021)*

anglofennica Edwards, 1921

embla Hackman, 1971

lugens (Wiedemann, 1817 – *Mycetophila*) * †

lundstroemi Edwards, 1921 * †

ornaticollis (Meigen, 1818 – *Mycetophila*) * †

nigricollis (Zetterstedt, 1852 – *Mycetophila*)

longicornis (Walker, 1856 – *Mycetophila*)

truncata Edwards, 1921 * †

zaitzevi Kurina, 1998 * †

pyxidiiformis: Zaitzev, 1983, in part, misident.

ALLODIOPSIS Tuomikoski, 1966

domestica (Meigen, 1830 – *Mycetophila*) *

korolevi Zaitzev, 1982

rustica (Edwards, 1941 – *Rhymosia*) * †

ANATELLA Winnertz, 1864

alpina Plassmann, 1977 *

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- ankeli* Plassmann, 1977 *
- bremia* Chandler, 1994
- ciliata* Winnertz, 1864 *
- dampfi* Landrock, 1924 *
- emergens* Caspers, 1987 *
- flavomaculata* Edwards, 1925 *
- lenis* Dziedzicki, 1923 *
- longisetosa* Dziedzicki, 1923 *
- piligera* Edwards, 1925
- minuta* (Staeger, 1840 – *Mycetophila*)
- pseudogibba* Plassmann, 1977
- gibba*: Chandler, 1977, misident.
- setigera* Edwards, 1921 *
- simpatica* Dziedzicki, 1923 *
- incisurata* Edwards, 1925
- turi* Dziedzicki, 1923 *
- unguigera* Edwards, 1921 *
- BRACHYCAMPTA** Winnertz, 1864 [Raised to generic status \(Magnussen et al. 2021\)](#)
- alternans* (Zetterstedt, 1838 – *Mycetophila*) *
- angulata* Lundström, 1913
- barbata* Lundström, 1909
- czernyi* Landrock, 1912
- foliifera* Strobl, 1910
- triangularis*: authors, misident.
- grata* (Meigen, 1830 – *Mycetophila*) * †
- nigricollis*: Edwards, 1921, misident.
- neglecta* (Edwards, 1925 – *Allodia*) *
- pistillata* Lundström, 1911 *
- protenta* (Laštovka & Matile, 1974 – *Allodia*) †
- mendli* (Plassmann, 1977 – *Allodia*)
- silvatica* Landrock, 1912 *
- westerholti* (Caspers, 1980 – *Allodia*)
- retracta*: Caspers & Plassmann, 1986, misident.
- BRACHYPEZA** Winnertz, 1864
- Subgenus **BRACHYPEZA** sensu stricto
- armata* Winnertz, 1864 * †
- bisignata* Winnertz, 1864 * †
- radiata* Jenkinson, 1908
- BREVICORNU** Marshall, 1896
- arcticoides* Caspers, 1985 [Corrected by Chandler \(2000\)](#)
- fasciculatum*: misident., not (Lackschewitz, 1937 – *Allodia*)
- auriculatum* (Edwards, 1925 – *Allodia*) *
- canadense* Zaitzev, 1988 [Added by Chandler \(2013\)](#)
- sp. near *arcticum*: sensu Chandler, 2013 [Corrected here](#)
- canescens* (Zetterstedt, 1852) [Corrected by Kjærandsen \(2005\)](#)
- griseolum*: Edwards, 1925, misident., not (Zetterstedt, 1852)
- fennicum* (Landrock, 1927 – *Allodia*)
- fissicauda* (Lundström, 1911 – *Brachycampta*) *
- foliatum* (Edwards, 1925 – *Allodia*) *
- fuscipenne* (Staeger, 1840 – *Mycetophila*) *
- glandis* Laštovka & Matile, 1974 *
- griseicolle* (Staeger, 1840 – *Mycetophila*) * †
- sericeum*: (Walker, 1837 – *Mycetophila*), misident.
- caudatum* (Winnertz, 1864 – *Brachycampta*)
- griseolum* (Zetterstedt, 1852 – *Mycetophila*) *
- boreale* (Lundström, 1914 – *Brachycampta*) [Syn. by Kjærandsen \(2005\)](#)
- improvisum* Zaitzev, 1992 [Added by Chandler \(2016\)](#)
- intermedium* (Santos Abreu, 1920 – *Allodia*)
- hissaricum* Zaitzev, 1985
- kingi* (Edwards, 1925 – *Allodia*)
- nigrofuscum* (Lundström, 1909 – *Brachycampta*) *
- parafennicum* Zaitzev in Zaitzev & Polevoi, 1995. [Added by Chandler \(2013\)](#)
- proximum* (Staeger, 1840 – *Mycetophila*) *
- brachycera*: (Lundström, 1909 – *Brachycampta*), misident.
- rosmellitum* Chandler, 2001 [Added by Chandler \(2001\)](#)
- ruficorne* (Meigen, 1838 – *Mycetophila*) * †
- hastatum* (Winnertz, 1864 – *Brachycampta*)
- cinereum* (Lundström, 1911 – *Brachycampta*)
- serenum* (Winnertz, 1864 – *Brachycampta*) *

- sericoma* (Meigen, 1830 – *Mycetophila*) * †
amoenum (Winnertz, 1864 – *Brachycampta*)
subfissicauda Zaitzev, 1985 **Added by Chandler (2015a)**
verralli (Edwards, 1925 – *Allodia*) *
 sp. near *arcticum*: Kjærandsen, in prep. *
arcticum: misident., not (Lundström, 1913 – *Brachycampta*)
- CORDYLA** Meigen, 1803
POLYXENA Meigen, 1800, suppr.
PACHYPALPUS Macquart, 1834
brevicornis (Staeger, 1840 – *Pachypalpus*) *
crassicornis Meigen, 1818 * †
fasciata Meigen, 1830 *
flaveola Haliday in Curtis, 1831, nomen nudum
fulveola Haliday, 1838
fissa Edwards, 1925 * †
flaviceps (Staeger, 1840 – *Pachypalpus*) *
fusca Meigen, 1804 *
nitens: Edwards, 1913, misident.
insons Laštovka & Matile, 1974 *
murina Winnertz, 1864 *
nitidula Edwards, 1925 *
parvipalpis Edwards, 1925
pusilla Edwards, 1925 *
semiflava (Staeger, 1840 – *Pachypalpus*) *
 sp. near *murina*: Kurina, in prep. * **Added here**
- EXECHIA** Winnertz, 1864
bicincta (Staeger, 1840 – *Mycetophila*)
interrupta (Zetterstedt, 1852 – *Mycetophila*)
borealis Lundström, 1912 * **Reinstated by Kjærandsen et al. (2007a)**
frigida: authors, misident., not (Boheman, 1865 – *Mycetophila*) **Corrected by Chandler and Perry (2011)**
chandleri Caspers, 1987
cinnata Johannsen, 1912
cincta Winnertz, 1864 * †
confinis Winnertz, 1864 *
contaminata Winnertz, 1864 * †
dizona Edwards, 1924 *
- dorsalis* (Staeger, 1840 – *Mycetophila*) * †
 ? *diagonalis* (Meigen, 1818 – *Mycetophila*)
exigua Lundström, 1909 *
festiva Winnertz, 1864 * †
fusca (Meigen, 1804 – *Mycetophila*) * †
fungorum: authors, misident.
lateralis (Meigen, 1818 – *Mycetophila*)
guttiventris (Meigen, 1830 – *Mycetophila*)
fuscata: (Walker, 1856 – *Mycetophila*), misident.
lucidula (Zetterstedt, 1838 – *Mycetophila*)
macula Chandler, 2001 **Replacement name (Chandler 2001)**
maculipennis (Stannius, 1831 – *Mycetophila*), preocc.
neorepanda Lindemann in Lindemann, Søli & Kjærandsen, 2021
repanda: Edwards, 1941, misident., not Johannsen, 1912. **Corrected by Lindemann et al. (2021)**
nigra Edwards, 1925 *
nigroscutellata Landrock, 1912 *
parva Lundström, 1909 *
parvula (Zetterstedt, 1852 – *Mycetophila*) *
nana (Staeger, 1840 – *Mycetophila*), preocc.
lateralis: Lundström, 1909, misident.
pectinivalva Stackelberg, 1948
pseudocincta Strobl, 1910 *
pseudofestiva Lackschewitz, 1937 *
repandoides Caspers, 1984
separata Lundström, 1912 †
seriata (Meigen, 1830 – *Mycetophila*) *
pallida (Stannius, 1831 – *Mycetophila*)
spinigera Winnertz, 1864 **Added by Gibbs (2011)**
spinuligera Lundström, 1912 * †
spinigera: Edwards, 1925, misident.
styriaca Strobl, 1898
sororcula Lackschewitz, 1937
- EXECHIOPSIS** Tuomikoski, 1966
 Subgenus *EXECHIOPSIS* sensu stricto
clypeata (Lundström, 1911 – *Exechia*) * †
dryaspagensis Chandler, 1977

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dumitrescae (Burghese-Balacesco, 1972 – *Exechia*) *

dumitrescui, incorrect original spelling

fimbriata (Lundström, 1909 – *Exechia*) *

forcipata (Lackschewitz, 1937 – *Exechia*)

Added by Chandler (2014)

furcata (Lundström, 1911 – *Exechia*)

hammi (Edwards, 1925 – *Exechia*) *

indecisa (Walker, 1856 – *Mycetophila*) *

tenuicornis (van der Wulp, 1859 –

Mycetophila)

intersecta (Meigen, 1818 – *Mycetophila*) *

gracilicornis (Landrock, 1912 – *Exechia*)

jenkinsoni (Edwards, 1925 – *Exechia*) *

ligulata (Lundström, 1913 – *Exechia*)

magnicauda (Lundström, 1911 – *Exechia*)

pseudindecisa Laštovka & Matile, 1974

pulchella (Winnertz, 1864 – *Exechia*) *

subulata (Winnertz, 1864 – *Exechia*) * †

unguiculata (Lundström, 1911 – *Exechia*) *

Subgenus *XENEXECHIA* Tuomikoski, 1966

crucigera (Lundström, 1909 – *Exechia*)

davatchii (Matile, 1969) Added by
Chandler and Perry (2011)

leptura (Meigen, 1830 – *Mycetophila*) *

membranacea (Lundström, 1912 – *Exechia*)

pollicata (Edwards, 1925 – *Exechia*)

seducta (Plassmann, 1976 – *Exechia*)

Added by Gibbs (2009)

MYROSIA Tuomikoski, 1966 Generic rank:
Søli, Vockeroth and Matile (2000)

maculosa (Meigen, 1818 – *Mycetophila*)

NOTOLOPHA Tuomikoski, 1966 Generic rank:
Søli, Vockeroth and Matile (2000)

cristata (Staeger, 1840 – *Mycetophila*)

PSEUDEXECHIA Tuomikoski, 1966

aurivernica Chandler, 1978 *

monica Kjærandsen & Chandler, 2006

Added by
Kjærandsen and Chandler (2006)

parallela (Edwards, 1925 – *Exechia*) *

tresignata (Edwards, 1913 – *Exechia*) * †

trivittata (Staeger, 1840 – *Mycetophila*) * †

tuomikoskii Kjærandsen, 2009 Added by
Kjærandsen (2009)

PSEUDOBACHYPEZA Tuomikoski, 1966

helvetica (Walker, 1856 – *Boletina*) *

spuria (Edwards, 1913 – *Brachypeza*)

PSEUDORYMOSIA Tuomikoski, 1966

fovea (Dziedzicki, 1910 – *Rymosia*) *

RYMOSIA Winnertz, 1864

RHYMOSIA, error

acta Dziedzicki, 1910

affinis Winnertz, 1864 *

gracilipes Dziedzicki, 1910

armata Lackschewitz, 1937 (*Rhymosia*)

bifida Edwards, 1925 (*Rhymosia*) *

britteni Edwards, 1925 (*Rhymosia*)

connexa Winnertz, 1864 *

coulsoni Chandler, 1994

fasciata (Meigen, 1804 – *Mycetophila*) * †

discoidea: authors, misident.

fosteri Chandler, 1994

placida Winnertz, 1864 *

setiger Dziedzicki, 1910

signatipes (van der Wulp, 1859 – *Mycetophila*)

truncata Winnertz, 1864

winnertzi Barendrecht, 1938

speyae Chandler, 1994

spinipes Winnertz, 1864

thorneae Chandler, 1994

virens Dziedzicki, 1910 *

STIGMATOMERIA Tuomikoski, 1966

crassicornis (Stannius, 1831 – *Mycetophila*) *

Feminine gender (Chandler 1999)

? *bicolor* (Macquart, 1830 – *Mycetophila*)

sobria (Walker, 1856 – *Mycetophila*)

- SYNPLASTA** Skuse, 1890
GYMNOGONIA Tuomikoski, 1966
exclusa (Dziedzicki, 1910 – *Rymosia*) Added by Chandler and Perry (2011)
sintensis (Lackschewitz, 1937 – *Rhymosia*) Syn. by Ševčík (2009)
gracilis (Winnertz, 1864 – *Rymosia*) * †
excogitata: ? misident., not (Dziedzicki, 1910 – *Rymosia*)
macrura: (Edwards, 1925 – *Rhymosia*), misident.
ingeniosa (Kidd, 1969 – *Allodiopsis*)
rufilatera (Edwards, 1941 – *Rhymosia*)
- TARNANIA** Tuomikoski, 1966
dziedzickii (Edwards, 1941 – *Rhymosia*) *
fenestralis (Meigen, 1818 – *Mycetophila*) * †
nemoralis (Edwards, 1941 – *Rhymosia*)
tarnanii (Dziedzicki, 1910 – *Rymosia*)
- Tribe Mycetophilini
DYNATOSOMA Winnertz, 1864
cochleare Strobl, 1895
fuscicorne (Meigen, 1818 – *Mycetophila*) *
nigromaculatum Lundström, 1913
abdominale: misident., not (Staeger, 1840 – *Mycetophila*)
reciprocum (Walker, 1848 – *Mycetophila*) *
nigricoxa (Zetterstedt, 1852 – *Mycetophila*)
thoracicum (Zetterstedt, 1838 – *Mycetophila*)
norwegiense Zaitzev & Økland, 1994
 Syn by Kjærandsen et al. (2007b)
- EPICYPTA** Winnertz, 1864
DELOPSIS Skuse, 1890
ALLOPHALLUS Dziedzicki, 1923
aterrima (Zetterstedt, 1852 – *Mycetophila*) *
selecta (Walker, 1856 – *Mycetophila*)
unicolor: Edwards, 1913, misident.
fumigata (Dziedzicki, 1923 – *Allophallus*)
 Added by Chandler (2014)
- limnophila* Chandler, 1981 *
scatophora: Edwards, 1913, misident.
torquata Matile, 1977 Added by Chandler (2020)
MACROBRACHIUS Dziedzicki, 1889
kowarzii Dziedzicki, 1889 Added by Alexander (2017)
MYCETOPHILA Meigen, 1803
FUNGIVORA Meigen, 1800, suppr.
MYCOTHERA Winnertz, 1864
OPISTHOLOBA Mik, 1891
abbreviata Landrock, 1914
abjecta (Laštovka, 1963 – *Fungivora*) *
adumbrata Mik, 1884 *
alea Laffoon, 1965 * †
lunata: Walker, 1856, misident.
guttata Dziedzicki, 1884, preocc.
autumnalis Lundström, 1909 *
bialorussica Dziedzicki, 1884
blanda Winnertz, 1864 *
bohémica (Laštovka, 1963 – *Fungivora*)
britannica Laštovka & Kidd, 1975 * †
caudata Staeger, 1840
cingulum Meigen, 1830 * †
confluens Dziedzicki, 1884 *
confusa Dziedzicki, 1884
affluctata Edwards, 1941
curviseta Lundström, 1911 * †
czizekii Landrock, 1911
deflexa Chandler, 2001 Replacement name for misidentified species
gratiosa: misident., not Winnertz, 1864
dentata Lundström, 1913 *
dziedzickii Chandler, 1977
obscura Dziedzicki, 1884, preocc
edwardsi Lundström, 1913 * †
nebulosa: Edwards, 1913, misident.
eppingensis Chandler, 2001 * Added by Chandler (2001)
evanida Laštovka, 1972
finlandica Edwards, 1913 *

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- forcipata* Lundström, 1913 *
- luteicauda* Edwards, 1913
- formosa* Lundström, 1911 *
- fraterna* Winnertz, 1864 * †
- freyii* Lundström, 1909
- fungorum* (De Geer, 1776 – *Tipula*) * †
- punctata* Meigen, 1804
- striata* (Fabricius, 1805 – *Sciara*)
- trivialis* Meigen, 1830
- unicolor* Meigen, 1838, preocc.
- maculosa*: Walker, 1856, misident.
- gibbula* Edwards, 1925 *
- gibba*: authors, misident.
- hetschkoi* Landrock, 1918 *
- hyrcania* Laštovka & Matile, 1969 [Added by Chandler \(2016\)](#)
- ichneumonea* Say, 1823 * †
- centralis* Meigen, 1830
- idonea* Laštovka, 1972 [Added by Strachan \(2020\)](#)
- immaculata* (Dziedzicki, 1884 – *Mycothera*) *
- lamellata* Lundström, 1911
- lapponica* Lundström, 1906
- lastovkai* Caspers, 1984
- lubomirskii* Dziedzicki, 1884
- luctuosa* Meigen, 1830 * †
- lunata* Meigen, 1804
- magnicauda* Strobl, 1895 * †
- marginata* Winnertz, 1864 * †
- mitis* (Johannsen, 1912 – *Mycothera*)
- jenkinsoni* Edwards, 1941
- mohilevensis* Dziedzicki, 1884
- morosa* Winnertz, 1864
- occultans* Lundström, 1913 *
- tarsata* Winnertz, 1864, preocc.
- ocellus* Walker, 1848 * †
- dimidiata* Staeger, 1840, preocc.
- ornata* Stephens, 1846 * †
- ornata* Stephens, 1829, nomen nudum
- rufescens*: authors, misident.
- lutescens*: Walker, 1856, misident.
- perpallida* Chandler, 1993 * †
- pictula* Meigen, 1830
- bimaculata* (Fabricius, 1805 – *Sciara*), preocc.
- arcuata*: Walker, 1856, ? misident.
- pumila* Winnertz, 1864 *
- rudis* Winnertz, 1864 *
- ruficollis* Meigen, 1818
- lineola*: authors, misident.
- schnablui* (Dziedzicki, 1884 – *Mycothera*)
- scotica* Edwards, 1941
- sepulta* (Laffoon, 1957 – *Fungivora*)
- sigmoides* Loew, 1869 [Added by Gibbs \(2009\)](#)
- signata* Meigen, 1830 *
- signatoides* Dziedzicki, 1884 *
- sordida* van der Wulp, 1874 *
- czizeki*: Edwards, 1925, misident.
- spectabilis* Winnertz, 1864 *
- stolida* Walker, 1856 *
- stricklandi* (Laffoon, 1957 – *Fungivora*) *
- strigata* Staeger, 1840 *
- fuliginosa* Dziedzicki, 1884
- strigatoides* (Landrock, 1927 – *Fungivora*) *
- stylata* (Dziedzicki, 1884 – *Mycothera*) * †
- stylatiformis* Landrock, 1925 [Added by Chandler \(2015a\)](#)
- sublunata* Zaitzev, 1998 [Added by Chandler \(2011\)](#)
- subsigillata* Zaitzev, 1999 *
- sigillata*: misident., not Dziedzicki, 1884 [Corrected by Chandler \(2006\)](#)
- sumavica* (Laštovka, 1963 – *Fungivora*) *
- tridentata* Lundström, 1911
- trinotata* Staeger, 1840 *
- russata* Dziedzicki, 1884
- uliginosa* Chandler, 1988 *
- unicolor* Stannius, 1831 * †
- uninotata* Zetterstedt, 1852
- unipunctata* Meigen, 1818 *
- vittipes* Zetterstedt, 1852 *
- v-nigrum* Lundström, 1913
- PHRONIA* Winnertz, 1864
- TELMAPHILUS* Becker, 1908
- basalis* Winnertz, 1864 *

- biarcuata* (Becker, 1908 – *Telmaphilus*) * †
nitidiventris: Winnertz, 1864, misident.
johannae Steenberg, 1924
praecox Edwards, 1925
bicolor Dziedzicki, 1889 Added by Chandler (2015a)
braueri Dziedzicki, 1889 *
? *annulata* Winnertz, 1864, nomen dubium
caliginosa Dziedzicki, 1889
cinerascens Winnertz, 1864 *
conformis (Walker, 1856 – *Mycetophila*) *
leioides (Walker, 1856 – *Mycetophila*)
girschnerii Dziedzicki, 1889
coritanica Chandler, 1992 *
tarsata: authors, ? misident.
? *crassipes* Winnertz, 1864, nomen dubium
bicolor: Edwards, 1913, misident.
disgrega Dziedzicki, 1889
egregia Dziedzicki, 1889 * †
electa Dziedzicki, 1889
elegantula Hackman, 1970 Added by Chandler (2020)
exigua (Zetterstedt, 1852 – *Mycetophila*) * †
rustica Winnertz, 1864
flavipes Winnertz, 1864 *
forcipata Winnertz, 1864 *
forcipula Winnertz, 1864 Added by Chandler (2010c) and Chandler & Perry (2011)
humeralis Winnertz, 1864 *
forcipula: authors, misident.
interstincta Dziedzicki, 1889
longelamellata Strobl, 1898 Added by Chandler (2018a)
mutabilis Dziedzicki, 1889
nigricornis (Zetterstedt, 1852 – *Mycetophila*) *
dubia Dziedzicki, 1889
nitidiventris (van der Wulp, 1859 – *Mycetophila*) *
vitiosa Winnertz, 1864
notata Dziedzicki, 1889 *
obtusa Winnertz, 1864 *
taczanowskyi: Edwards, 1913, misident.
persimilis Hackman, 1970
petulans Dziedzicki, 1889
portschinskyi Dziedzicki, 1889
siebeckii Dziedzicki, 1889
sinuata Freeman, 1956
signata Winnertz, 1864 *
? *austriaca* Winnertz, 1864, nomen dubium
strenua Winnertz, 1864 *
? *flavicollis* Winnertz, 1864, nomen dubium
sudetica Dziedzicki, 1889 *
sylvatica Dziedzicki, 1889
tenuis Winnertz, 1864 * †
tiefii Dziedzicki, 1889 Added by Chandler (2006)
triangularis Winnertz, 1864 * †
elegans: Edwards, 1913, misident.
vitrea Plassmann, 1999
carli Chandler, 2001 Syn. by Chandler (2006)
longelamellata: misident., not Strobl, 1898
Corrected by Chandler (2001)
PLATUROCYPTA Enderlein, 1910
EPICYPTA: Edwards, 1925, misident.
punctum (Stannius, 1831 – *Mycetophila*) *
testata (Edwards, 1924 – *Epicypta*) *
trinotata: (Winnertz, 1864 – *Mycetophila*), misident.
SCEPTONIA Winnertz, 1864
concolor Winnertz, 1864
costata (van der Wulp, 1859 – *Mycetophila*) *
cryptocauda Chandler, 1991 *
flavipuncta Edwards, 1925
fumipes Edwards, 1925 *
fusciplapis Edwards, 1925
humerala Edwards, 1941
longisetosa Ševčík, 2004 Added by Chandler (2013)
membranacea Edwards, 1925 *
nigra (Meigen, 1804 – *Mycetophila*) *
nitida (Meigen, 1830 – *Mycetophila*)
pilosa Bukowski, 1934
pughi Chandler, 1991
regni Chandler, 1991
tenuis Edwards, 1925

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TRICHONTA Winnertz, 1864*apicalis* Strobl, 1898*vernalis* Landrock, 1913*atricauda* (Zetterstedt, 1852 – *Mycetophila*) **fissicauda*: Edwards, 1913, misident.*melanura*: Edwards, 1925, misident.*bicolor* Landrock, 1912*brigantia* Chandler, 1992*clavigera* Lundström, 1913 **falcata* Lundström, 1911 **flavicauda* Lundström, 1914*foeda* Loew, 1869 **stereana* Edwards, 1925*fragilis* Gagné, 1981 **fusca* Landrock, 1918*girschneri* Landrock, 1912

Added by Chandler (2020)

hamata Mik, 1880*icenica* Edwards, 1925*melanura* (Staeger, 1840 – *Mycetophila*) **melanopyga* (Zetterstedt, 1852 – *Mycetophila*)*atricauda*: Edwards, 1925, misident.*nigritula* Edwards, 1925 **pulchra* Gagné, 1981*subfusca* Lundström, 1909*submaculata* (Staeger, 1840 – *Mycetophila*)*subterminalis* Zaitzev & Menzel, 1996

Added here

terminalis (Walker, 1856 – *Mycetophila*) **tristis* (Strobl, 1891 – *Phronia*) Added by
Chandler (2018a)*venosa* (Staeger, 1840 – *Mycetophila*) †*vitta* (Meigen, 1830 – *Mycetophila*) * †*umbratica* Winnertz, 1864*vulcani* (Dziedzicki, 1889 – *Phronia*) **ZYGOMYIA* Winnertz, 1864*humeralis* (Wiedemann, 1817 – *Mycetophila*) **pusilla* (Meigen, 1830 – *Mycetophila*)*nigritula* (Walker, 1856 – *Mycetophila*)*kiddi* Chandler, 1991*matilei* Caspers, 1980 Added by
Chandler (2013)*notata* (Stannius, 1831 – *Mycetophila*) * †*pictipennis* (Staeger, 1840 – *Mycetophila*) * †*binotata* (Haliday in Walker, 1856 –*Mycetophila*)*pseudohumeralis* Caspers, 1980 **semifusca* (Meigen, 1818 – *Mycetophila*) **valeriae* Chandler, 1991 **valida* Winnertz, 1864 **paludosa*: (Walker, 1856 – *Mycetophila*),
misident.*vara* (Staeger, 1840 – *Mycetophila*) *

Phylogeny of fungus gnats

There have in recent years been a good number of attempts to establish the relationships between the families, subfamilies and tribes of fungus gnats, employing both morphological and molecular techniques. While all such works conclude that most of the well-defined families are monophyletic, they differ widely in the conclusions regarding their relationships, including the position of Sciaridae and Cecidomyiidae and some genera unassigned to family within the superfamily Sciaroidea (e.g. Hippa and Vilkamaa 2006; Amorim and Rindal 2007; Jaschhof 2011; Ševčík *et al.* 2014, 2016). In these analyses, determining relationships depends on an assessment of which characters are plesiomorphous (i.e. ancestral traits retained in a range of unrelated taxa) or apomorphous (i.e. newly derived characters that have arisen only once, and can be defined as a synapomorphy indicating common ancestry for members of a group that is therefore monophyletic).

Although consensus has not yet been achieved, the monophyly and generic composition of the Mycetophilinae and its two tribes, Exechiini and Mycetophilini, have been well supported. This was explored by Rindal and Sølvi (2006), Rindal *et al.* (2007, 2009a, 2009b) and Burdíkova *et al.* (2019), and remains unchallenged by the various studies on the phylogeny of the wider groupings within Sciaroidea, although there is a lack of agreement on the identity of the sister group of Mycetophilinae. In most cases Mycetophilinae is concluded to have arisen within Gnoristinae, the precise relationship varying according to which genera assigned to that subfamily were used in the analysis. Borkent and Wheeler (2013) included *Leia* and *Manota* with Mycetophilinae in a clade nesting in Gnoristinae. In these analyses the present broad concept of Gnoristinae is thus found to be paraphyletic (i.e. excluding some taxa with which its members share a common ancestor). Oliveira and Amorim (2021), however, placed Mycomyinae as the sister group of Mycetophilinae.

Mycetophilinae is the most diverse group of fungus gnats today; its radiation apparently began early in the Paleogene (i.e. the early Tertiary period following the Cretaceous, comprising the Paleocene, Eocene and Oligocene periods), and many modern genera are represented in amber from this period. Divergence from the other subfamilies and families evidently took place during the Cretaceous period, when most of the modern families of Sciaroidea originated, following an earlier radiation of this group in the Jurassic period.

Within Mycetophilidae, the relative positions and definition of the subfamilies also differ between successive studies. Some results are based on a detailed analysis of morphological characters (e.g. Hippa *et al.* 2005 on Manotinae; Borkent and Wheeler 2013 on Sciophilinae; Oliveira and Amorim 2021 on Leiinae), while most recent studies concentrate on using molecular data (e.g. Rindal and Sølvi 2006; Rindal *et al.* 2009a; Ševčík *et al.* 2013 (including Manotinae), 2014, 2016; Kaspřák *et al.* 2019 (on Mycomyinae and Gnoristinae) or a combination of both (e.g. Rindal *et al.* 2009b).

The position of Manotinae, represented by only one species in Britain and Europe (but species-rich in the tropics), is particularly contentious. Hippa *et al.* (2005) found it to be

related to some genera within the then concept of Leiinae, which thus appeared paraphyletic. Ševčík *et al.* (2013) found it to be a sister group to a redefined Leiinae, from which *Docosia*, *Ectrepesthoneura* and *Syntemna* were excluded and placed in Gnoristinae. However, Kaspřák *et al.* (2019) found Manotinae to have a basal position in Mycetophilidae as sister group to the rest of the family, with Sciophilinae, Leiinae and Mycomyinae successively as sisters to a paraphyletic Gnoristinae, within which Mycetophilinae arose and was closest to *Docosia*. Contrary to this, Oliveira and Amorim (2021) concluded that Manotinae arose within Leiinae and assigned it a tribal rank along with five other tribes in that subfamily; their concept of Leiinae also excluded *Docosia*, *Ectrepesthoneura*, *Novakia* and *Tetragoneura* for which they proposed a new subfamily Tetragoneurinae. The latter was considered as sister to Leiinae, together with a group comprising Gnoristinae, Mycomyinae and Mycetophilinae in which the two latter were sister groups within the paraphyletic Gnoristinae.

Art Borkent (2018) provides insights into why such divergent and unstable results are obtained from the character sets and genes that have been used to assess relationships. Giving equal weighting to characters, so that synapomorphies are not clearly identified, appears to have been a problem with some morphology-based analyses. In molecular phylogenies he considers that work does not adequately distinguish apomorphous from plesiomorphous characters used to define taxa, while exact replication of previous work in this field is difficult, as new developments in the techniques employed quickly supersede those used earlier.

Fortunately, more fossil material of fungus gnats is becoming available; they are richly represented in amber, including from the Cretaceous period, when most of the principal lineages originated and knowledge of the relative age and likely time of origin of taxa may become clearer. Critical evaluation of morphological characters will be essential to place fossils within the context of a suprageneric classification.

History of fungus gnat studies in Britain and Europe

The first systematic treatment of the British species was by Francis Walker (1856), who included under Mycetophilidae 126 species in 14 of the genera of the present fungus gnat families as well as some now placed in Sciaridae, Mycetobiidae and Cecidomyiidae; of 23 included genera, eight correspond to the present Mycetophilidae. This was soon followed by a monograph of the European fauna by Winnertz (1864), in which many of the presently recognised genera were first defined. The importance of the genitalia in distinguishing allied species was appreciated quite early with the revision of European species of the genus *Phronia* by the Polish worker Henryk Dziedzicki (1885), in which the genitalia of both sexes were illustrated for all described species. Another early systematic account of the British species was by Frederick Vincent Theobald (1892), who also included the other fungus gnat families as well as Sciaridae and *Mycetobia* within Mycetophilidae. He keyed 28 genera now included in Mycetophilidae, gave descriptions of 44 representative species in 24 of these genera and listed 34 other species as

occurring in Britain; he also gave a detailed account of the structure of the genitalia of *Phronia*, based on Dziedzicki's work.

In his revised checklist Verrall (1901) included 212 species under Mycetophilidae (sensu lato), of which 70 were considered doubtful; he commented that 'this family, though much improved, is still in a most unfinished condition'. Francis Jenkinson (1908) was the first in the 20th century to take up this challenge and provide notes assisting identification of a number of species; of 26 species discussed, 6 were noted as new to Verrall's list – Verrall had looked at Jenkinson's material, and *Brachypeza radiata* described as new by Jenkinson remains a valid species. Great advances were then made by Frederick Wallace Edwards, who began with a thorough update of knowledge of the British fauna (Edwards 1913), including a revision of Walker's collection; Sciaridae were not included. In his introductory remarks to that work he noted that 124 species were new to the list, while 50 names were now either synonyms or misidentifications. Keys were provided to genera, and to species level within some of the larger genera. Genitalia were illustrated for 45 species, and recent continental works (by Dziedzicki, Landrock and Lundström) with genitalia figures were cited as indispensable. Jenkinson was acknowledged for having made useful suggestions and for making available his extensive collection; 12 other collectors contributed to the material on which the 1913 paper was based.

A further significant advance was made by Dziedzicki (1915), who illustrated the genitalia of Winnertz's types, enabling their accurate identification; Winnertz's collection has not survived. Carl Lundström in Finland also continued with his series of publications (Lundström 1906 to 1916, Lundström and Frey 1913) describing new species. Edwards (1921) described some new species and his substantial revision of the British fauna (Edwards 1925) soon followed; this remained the main identification work on the British species until the handbook by Hutson *et al.* (1980) appeared. Edwards now included the Sciaridae as a subfamily, and also gave subfamily status to the other fungus gnat families now recognised (Ditomyiidae, Bolitophilidae, Diadocidiidae and Keroplatidae, the last separated into Ceroplatinae and Macrocerinae). Within the modern concept of Mycetophilidae were three subfamilies, Mycetophilinae as still constituted, Manotinae (not yet then recorded in Britain) and Sciophilinae, with the latter divided into four tribes (Mycomyiini, Sciophilini, Gnoristini and Leiini), broadly corresponding with the present day subfamilies. The two tribes of Mycetophilinae – Exechiini and Mycetophilini – were as presently recognised, except that *Cordyla* was included in Mycetophilini. The sciarid genus *Pnyxia* was included in Leiini; apart from that, 48 genera and 299 species now in Mycetophilidae (of which 199 were Mycetophilinae) were included. In the other four fungus gnat families were 53 species in 13 genera, so altogether Edwards included 352 species of fungus gnats and 45 species of Sciaridae. Edwards estimated that the final British total was not likely to be much less than 500.

Karl Landrock in Germany had also continued to work on the central European fauna and was author of a monograph of the Palaearctic species of fungus gnats (Landrock 1927) and then keys to the German fungus gnat fauna (Landrock 1940). A further update of the British fauna (Edwards 1941) was published posthumously. This brought together the additional species that had been discovered, and followed his examination of the Jenkinson and J.J.F.X. King collections. The genera *Manota* and *Eudicrana* were added,

and 42 species (35 Mycetophilidae and 17 of them Mycetophilinae) were new to the British list. The Diptera section of the Kloet and Hincks (1945) checklist, compiled by Ralph Coe, thus included 394 species of fungus gnats (excluding Sciaridae, which were still treated as a subfamily).

During the 1950s, Leonard Kidd became interested in fungus gnats after describing a new species *Mycomya britteni* (Kidd 1955), and he authored further notes and papers in the 1960s (Kidd 1962, 1966, 1969). In 1969 he began collaboration with Michael Ackland with preparation in mind of a handbook on the British fungus gnats, for which Michael would contribute the illustrations. He studied Michael's fungus gnat material collected in Scotland, and their joint papers (Kidd and Ackland 1969, 1970a, 1970b) followed. Tony Hutson then became involved in the proposed handbook, and some papers (Hutson and Kidd 1971, 1974, 1975; Hutson 1979) appeared in preparation for this. Leonard also contributed to a study of the *Mycetophila ruficollis* group with the Czech fungus gnat specialist Petr Laštovka (Laštovka and Kidd 1975), who had previously revised the European species of this group. These advances enabled 416 species (225 of them Mycetophilinae) to be recognised in Mycetophilidae in the next checklist of British Diptera (Kloet and Hincks 1976), in which Sciaridae were accorded family rank; the lists of both families were compiled by Tony Hutson.

The handbook (Hutson *et al.* 1980) soon followed. It was originally proposed to include the entire group in a single handbook. However, in view of the number of unresolved taxonomic problems in the subfamily Mycetophilinae, it was decided to produce the first of two parts dealing with the 203 species (increased from 191 in the 1976 checklist) of the smaller subfamilies, including those that have since been raised to family rank. The present author had by then begun to publish articles on the British fungus gnats (Chandler 1975 and following references) and there has been a steady increase in the number of additional species recognised since then. The British Isles checklist (Chandler 1998b) accorded separate family status to Ditomyiidae, Bolitophilidae, Diadocidiidae and Keroplatidae, which then together included 74 species (an increase of 8 from 1976, but now reduced by one with the synonymy of *Macrocera propleuralis*), while Mycetophilidae included 452 species, of which 302 were Mycetophilinae. The current updated list had by 2020 reached 497 species of Mycetophilidae, here increased to 501, and the overall fungus gnat total is now 574.

Comparison with the European fungus gnat fauna

Many fungus gnat species are very widespread, and many of the British species may occur throughout Europe, extending to North Africa, the Eastern Palaearctic (i.e. the far east of Russia, and Japan), or even to North America. Some of the commonest species and even some rarities have a Holarctic distribution, i.e. they are found in North America as well as Eurasia, particularly true of species with a more northern (or boreal) distribution. Being principally forest insects, they are influenced more by the microclimate within such habitats than by the overall climatic conditions, though seasonal occurrence will vary through their range.

In this handbook the international distribution of each species is summarised in the species accounts. Of the Mycetophilinae that occur in Britain, 94 are considered to be Holarctic, a higher proportion than in the other subfamilies. Where species are defined as Palaearctic, this indicates that there are records from the eastern parts of this region and this applies to a further 128 of the British species. For the remaining species, which are presently only known from the western Palaearctic, most are recorded from Europe only, but some also occur in North Africa and/or the Near East. Overall, 44 of the British Mycetophilinae species have been recorded in North Africa.

With at least 574 species of fungus gnats now known to occur in Britain, it is clear that they constitute a substantial portion of our biodiversity. However, this is dwarfed by the European fauna. The *Fauna Europaea* database (Chandler 2005a) recognised 1121 species, of which 942 were Mycetophilidae, 580 of which were Mycetophilinae; around 120 described species, including 36 species of Mycetophilinae, have been added since.

In Europe, fungus gnats reach their greatest diversity in the boreal forests of Northern Europe and in the montane forests of Central Europe. The Nordic gnat fauna, which comprises more than 1000 species, is now receiving much attention. An online checklist for this region (Kjærandsen 2016) included 921 named species (of these 818 are Mycetophilidae, 509 Mycetophilinae) and noted that more than 100 additional undescribed species were also known. Kjærandsen and Søli (2020) provided an updated Norwegian checklist of Mycetophilidae, including 821 species of which 118 were newly recognised and awaiting formal description; of these 543 are Mycetophilinae, of which 97 are unnamed. More species are continually being discerned through DNA barcoding (Jostein Kjærandsen *pers. comm.*). Many of the Nordic species have a boreal distribution extending across the Holarctic Region.

It will be interesting when these results have been published to be able to make a better comparison with our fauna. Two of the unnamed species (in *Brevicornu* and *Cordyla*) are already known to occur in Britain. Of the British Mycetophilinae, all but 11 are also known to occur in the Nordic region, excluding only species of which the only European records are from Britain (i.e. *Exechia cincinnata*, *Rymosia fosteri*), and some with an (as presently known) more southerly European distribution: *Brachycampta westerholti*, *Exechiopsis jenkinsoni*, *Pseudexechia monica*, *Epicypta torquata*, *Mycetophila lamellata*, *M. scotica*, *M. stylatiformis*, *Rymosia coulsoni*, *Sceptonia humerella*.

Some boreal species are known to occur in Scotland and several have recently been added on a single occurrence or on a few records. Chandler (2018a) listed 49 species presently known in Britain only from Scotland, of which 25 are recorded from three or fewer localities. Deforestation, which has been exacerbated in recent centuries, must have had an impact and some species were probably, as a result, lost from the Scottish fauna; others may have hung on in isolated locations to be discovered as forest cover again increases.

A number of studies in Scandinavia (Økland 1994, Økland 1996, Økland *et al.* 2005) have demonstrated that there is a significantly greater diversity in less managed forests than in those subject to forestry practices. Continuity of habitat (based on indicator species of saproxylic fungi and lichens) was the most significant factor in fungus gnat diversity. It

was concluded that continuity was more influential than the current amount of decaying wood at a site. Degree of spatial isolation from other species-rich sites was also important, diversity increasing with greater proximity to other such sites. Kjærandsen and Jordal (2007) used Malaise and window traps in surveys of the oceanic broad-leaved forests in W Norway. Known as temperate rain forests (with very high rainfall) they occupy the steep slopes between fjords and the treeless higher mountains. The most productive site Jordalsgrend (23,000 specimens of 315 species) was an old-growth forest dominated by downy birch *Betula pubescens* and aspen *Populus tremula*. Similar, albeit more restricted, sites in Scotland might be worth investigation.

Although continuity of habitat is clearly an important factor influencing the richness of the fungus gnat fauna of a site, it is also apparent that many species are very mobile and able to colonise new areas. This has been demonstrated in recent years by the number of apparently new arrivals in Britain that have subsequently spread widely within a few years of first being noticed (some examples are shown on maps in Fig. 9).

Recording

How and where to record fungus gnats

Most fungus gnats are found in forests and other wooded habitats, as might be expected since the larval development of many species is dependent on saproxylic or mycorrhizal fungi. The greatest number of site records has been based on adults obtained by sweeping with a net in suitable harbourages, such as along wooded stream banks and overhangs, sheltered slopes and hollows in woodland, in the vicinity of decaying trees or around accumulations of rotten wood. During dry spells gnats tend to congregate in these humid situations. They may also aestivate or hibernate in sheltered locations such as animal burrows and caves; Økland (1996) linked this behaviour with the longevity of adults in the absence of suitable fungus hosts for oviposition. However, in warm conditions they become active, and multi-species aerial 'swarms' may be observed where diffuse sunlight reaches these refuges. Some species may be found actively flying around colonies of fungus fruiting bodies. When more humid conditions prevail they disperse and range more widely in wooded habitats.

Fungus gnats may be found throughout the year, their relative abundance affected by prevailing weather conditions and the consequent effect on the availability of fungus hosts. Adults are generally most abundant in early summer and during the autumn. In the earlier period (usually May to June) species associated with saproxylic fungi (i.e. those growing on wood) are most evident, while in the autumn (especially the first half of October) those associated with terrestrial fungi predominate. When there has been a period of drought, numbers in these usual peak periods may be substantially reduced. As most species are not greatly restricted seasonally, no attempt has been made to suggest flight periods for individual species, and dates of occurrence are given only for species for which there are a small number of records.

The suggestion by Hutson *et al.* (1980) that the adults of most species are probably crepuscular, resting during the daylight period, may be true to some extent; a few species (e.g. *Monocentrotia lundstromi* Edwards, *Paratinia sciarina* Mik, both with unknown biology) are regularly found at light traps, along with the occasional common mycophagous species, but there is little evidence that nocturnal activity predominates.

Sap flows from trees may attract some species. Waterhouse (1998) noted swarms of small flies around a cut sycamore *Acer pseudoplatanus* stump at Coombe Valley RSPB Reserve, Staffordshire and on closer examination found that the attraction was sap exuding from thin stems of regrowth from the stump which had been damaged by grazing cattle. The 39 species of Diptera in these swarms included 32 common species of Mycetophilidae, including both saproxylic and terrestrial species, with a larger proportion of the latter.

Flower visiting is not commonly recorded in fungus gnats. Many species of Mycetophilidae may be swept from ivy flowers in autumn, and a few species are more regularly found at flowers, especially some Keroplatidae that have a long proboscis adapted for this purpose (species of *Macrorrhyncha*, *Asindulum* and *Antlemon*); these mainly occur at umbels (Apiaceae). *Greenomyia mongolica*, a species of Leiinae without a long proboscis, has often been found feeding at umbels as well as ivy flowers. Also in Mycetophilidae, the genus *Gnoriste* (with two British species), has a very long proboscis; other species of this genus in North America and Japan are known to feed at flowers, but this has yet to be recorded in our species. Goldblatt *et al.* (2004) found that the North American species *G. megarrhina* Osten Sacken, 1977 feeds at the tubular flowers of *Tolmiea menziesii* (Saxifragaceae). Okuyama *et al.* (2004) recorded *G. mikado* Okada, 1939 as a pollinator of *Mitella* (Saxifragaceae) in Japan; they also found species of *Boletina* and *Coelosia* (Gnoristinae without a modified proboscis) feeding at these flowers. Suetsugu and Sueyoshi (2017, 2018) found that *Cordyla* species, including the British species *C. pusilla* (as *C. sixi*) (Sueyoshi and Suetsugu 2018), were pollinators of *Aspidistra* (Asparagaceae) and *Asarum* (Aristolochiaceae) in Japan, and suggested that fungal mimicry (both by form and odour) by *Aspidistra* flowers might attract the gnats. Vogel and Martens (2000) found fungus gnats and sciarids to be pollinators of *Arisaema* (Araceae) species in Nepal, and also reported 16 species in 9 genera of Mycetophilinae as visiting these flowers in cultivation in Germany.

Prior to the 1980s, netting and rearing were practically the only methods of recording, apart from a few records from light traps. However, in recent decades many records, including a significant number of additions to the British list and other previously little-known species, have been obtained by passive sampling techniques. Malaise traps have proved most effective at recording fungus gnats, with large catches from many woodland and wetland sites in Britain. Water traps employed in the surveys of wetland sites in Wales and East Anglia also greatly increased knowledge of the fauna of those habitats. Flight interception traps attached to decaying trees are often the most productive method of recording fungus gnats in partially-wooded habitats, such as parkland, orchards and hedges; a design of flight interception trap with some success in these habitats is illustrated in Alexander and Chandler (2011) and Fleetwood and Chandler (2020). Vane flight interception traps (Schulten *et al.* 2005, McLean 2010) have also proved effective for

recording fungus gnats. Pitfall traps, also used in surveys of Welsh wetlands and in some upland sites, achieved less diverse catches but have added some important records from previously little-studied open habitats.

Fungus gnat recording

It is essential that all records include an accurate grid reference (to at least 1km square level), locality, date and recorder's name, preferably with details of the habitat. For specimens retained as vouchers, this information should be given on associated labels.

A recording scheme for fungus gnats covering the whole of the British Isles was established in 1986, and this has assisted in building the data on which the present assessments of distribution and frequency are based. It also resulted in a rapid increase in knowledge of the composition of our fauna. Apart from the new data resulting from ongoing fieldwork, it has also been possible to put this in a historic context by the examination of collections held by museums, which provide a useful comparison with the modern data.

Initially an A5 recording card was introduced, listing the 330 most often recorded species; any additional species had to be written in an "other species" box on the back of the card. In 2011 new cards, with all then known species listed on a set of two A4 cards, were provided, making it easier to record data. Most data were not recorded electronically until their transfer to spreadsheets by BRC staff began in the years up to 2012, but that has since become the predominant means of maintaining records.

An assessment of the conservation status of British fungus gnats was included in a wider review of those "Nematocera" and Aschiza not assessed by Falk (1991); this was first drafted in the 1990s and eventually published as a JNCC status review (Falk and Chandler 2005). That review only included species deemed to warrant conservation status. Following the data entry by BRC from the original recording scheme cards, maps showing distribution by hectads (10km squares) were prepared in 2013 for all species, based on records received up to 2011. This data was then used to provide the basis for a review of the status of all species of fungus gnats according to the latest IUCN criteria, as in recently published status reviews of other Diptera. From this, the need was recognised for many changes of status from the 2005 review, but this assessment remains unpublished.

Since then most data has also been entered directly into spreadsheets, and BRC have continued to assist with processing the remaining data that was only available on the cards. With their assistance, all available data up to 2020 have been collated and used to compile a new set of distribution maps, supplied by BRC in June 2021. These updated maps have further refined our knowledge, and show significant changes in the distribution of many species, while additional species continue to be found, which are often considered to be new arrivals in this country.

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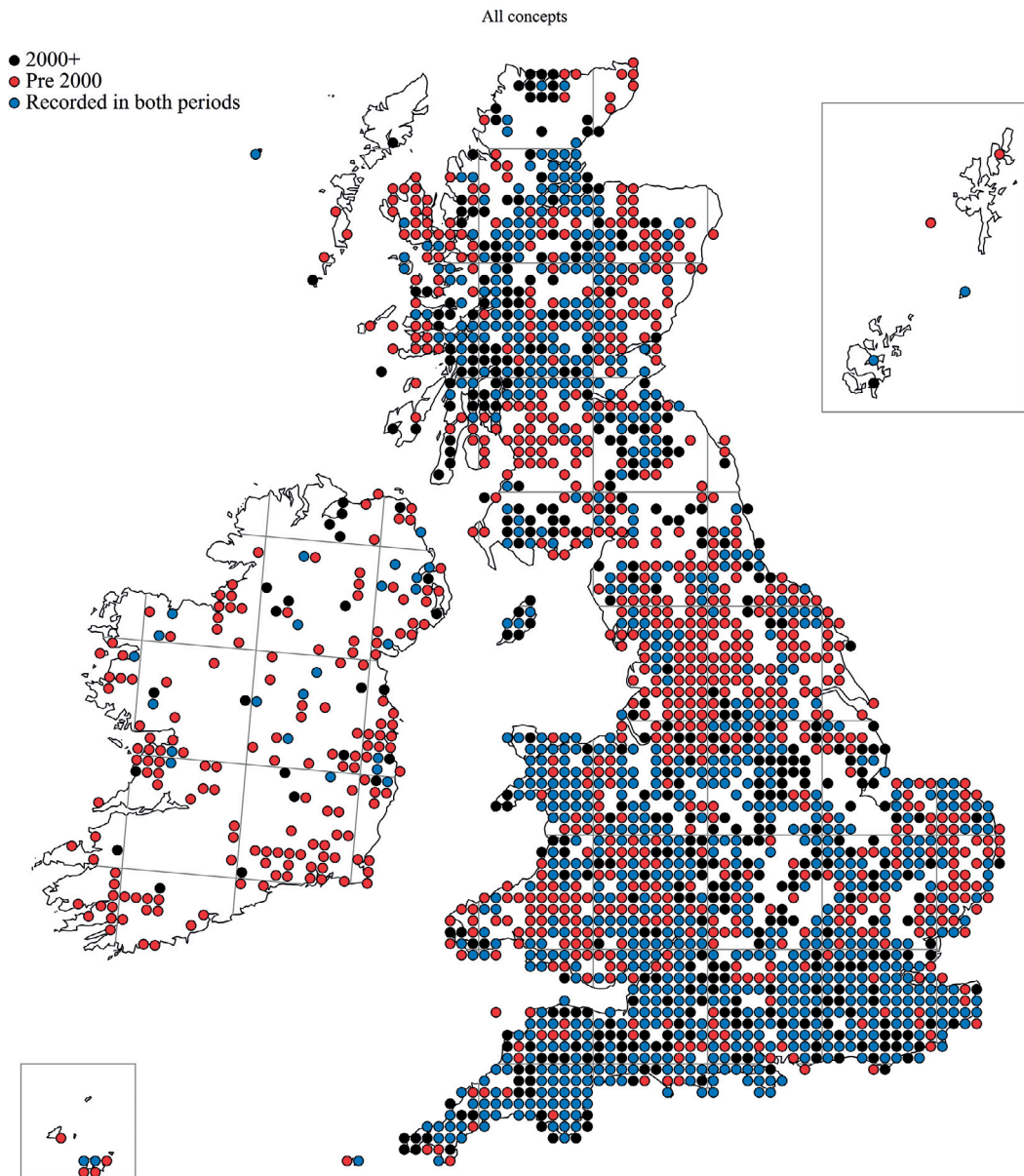


Figure 2. All hectads in the British Isles with fungus gnat records: red = records only before 2000; black = only from 2000 onwards; blue = from both periods.

While the 2013 maps distinguished whether records for a particular hectad were from before 1990, dated from 1990 onwards or amalgamated records from both periods, for the new maps it was considered more appropriate in the present context, and also to assist in any future status reviews, to use 2000 as the hinging date, and that is the case with the maps presented here.

The coverage of hectads in which there is at least one record of a fungus gnat species is shown in Figure 2, where the three date categories are as indicated above. The inset boxes are (top right) the Northern Isles (Orkney and Shetland), and (bottom left) the Channel Islands. The total number of hectads with records is 2,133, of which 1,915 are in Britain (including the Northern, Western and Scilly Isles), 204 in Ireland (including Northern Ireland), 8 in the Isle of Man and 6 in the Channel Islands. The map indicates where recording has been concentrated.

Future recording targeted in the red areas, and in the regions without any evidence of recording, would assist in improving knowledge of the fauna. It is particularly apparent that there has been a lower level of recording in Ireland, but the regional coverage there reflects the distribution and reduced extent of woodland compared to Britain. The least wooded parts of the country also show as white areas without records on the map of Britain, but there are some exceptions of hectads with woodland present but as yet no fungus gnat records, while some species of fungus gnat are found away from woodland in wetland or montane habitats.

The map in Figure 3 shows the comparative level of recording within each hectad, from which it is apparent that in only 31 hectads are there records of more than 200 species, with eight in the central Scottish Highlands, one in Wales and the remainder mainly spread across southern England.

In descending order of species totals, these 31 hectads are as follows, with the species total and the principal sites within the hectad given in each case: SU97 (293: Windsor Forest and Great Park – total 300 including parts of the Estate in other hectads SU96 – 156 and SU86 – 135), SU98 (285: including 273 at Burnham Beeches), TL03 (275: Flitwick Moor), SU78 (273: Warburg Reserve), SS50 (272: Locks Park Farm), SU20 (263: part of New Forest), NH80 (263: part of Spey valley: Feshiebridge; Kinrara; Loch an Eilein; Lynachlaggan), NJ02 (252: Grantown; Nethy Bridge), SU30 (244: part of New Forest), SU49 (243: Cothill and other wooded fens), SX77 (242: Yarner Wood; Bovey Valley), SO77 (238: Wyre Forest), TQ53 (234: Crowborough), TL66 (229: Chippenham Fen), SP40 (227: Lashford Lane Fen; Wytham Wood), NH91 (226: Abernethy Forest), NH31 (220: Dundreggan), NN96 (220: Linn of Tummel; Pass of Killiecrankie), NN65 (219: woods south of Loch Rannoch), SU26 (218: Savernake Forest), NN55 (216: Black Wood of Rannoch; Camghouran), NJ05 (211: Findhorn valley including Logie), TL87 (210: King's Forest, Suffolk), TQ49 (208: Epping Forest), TL99 (207: Thompson's Common; Wayland Wood), TL78 (205: Brandon Country Park; Elveden), SE20 (205: Nab's Wood; Cawthorne), SK29 (205: Wortley Top Forge; Wharncliffe Wood), ST30 (203: Burridge Common), TL25 (202: Waresley Wood), SN62 (201: Dinefwr Deer Park, top Welsh site).

The only Irish hectads with more than 100 species recorded are T19 (135: Glendalough, Co Wicklow) and V98 (113: Killarney, Co Kerry).

Figures 4–9 show examples of different types of distribution pattern that can be demonstrated from the maps for individual species.

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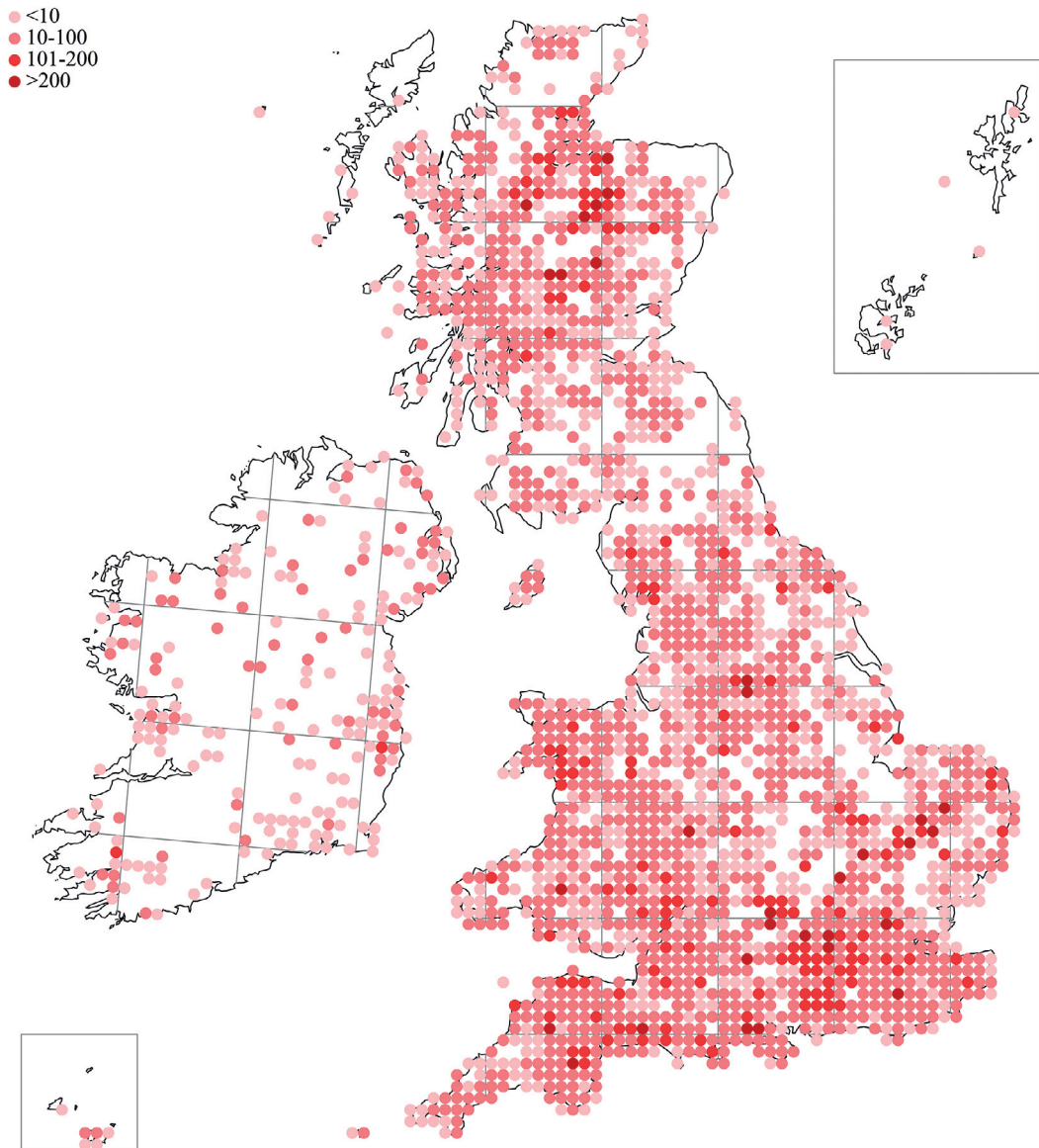


Figure 3. All hectads in the British Isles with fungus gnat records, with four shades indicating numbers of species recorded within each hectad: from lightest <10 through 10-100, 101-200 to the darkest >200.

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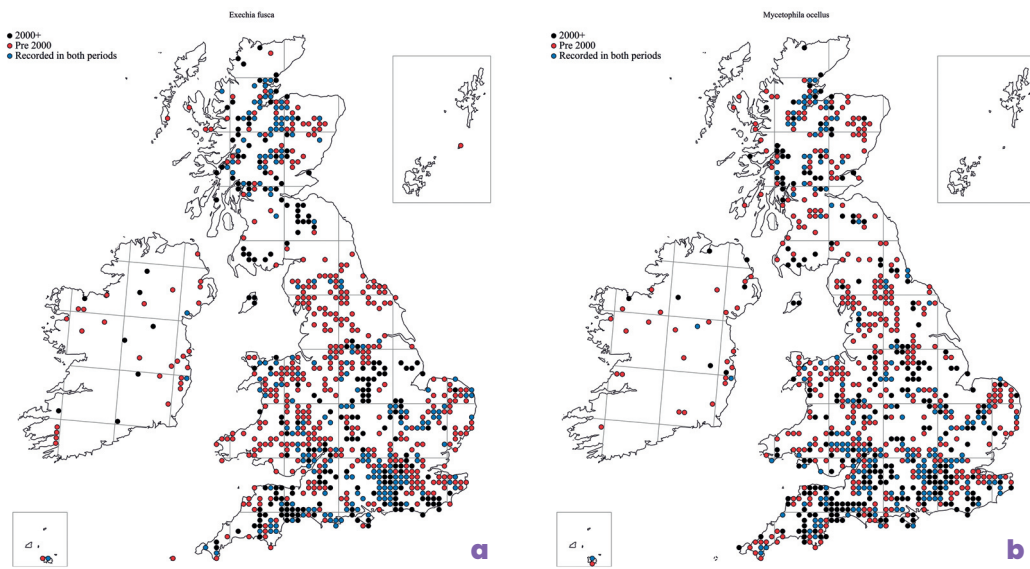


Figure 4. Common and widely distributed species: (a) *Exechia fusca*; (b) *Mycetophila ocellus*. In these and subsequent maps, colours are as in Figure 2.

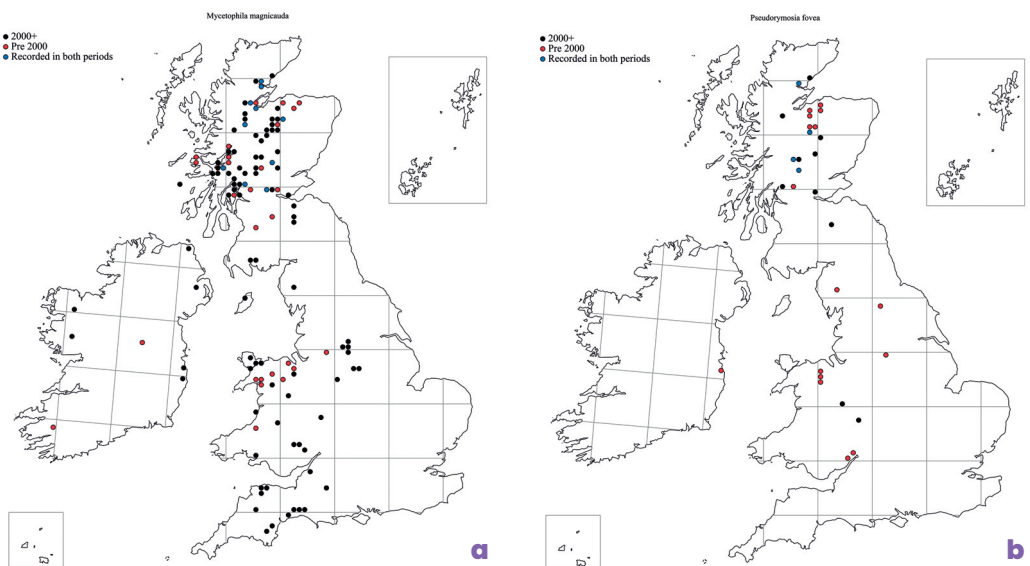


Figure 5. Species with a northern and western distribution: (a) *Mycetophila magnicauda* (123 hectads, reaching SW England and including 8 in Ireland; 90 British hectads include post-2000 records); (b) *Pseudorymosia fovea* (30 hectads including one in Ireland, reaching south as far as the Forest of Dean).

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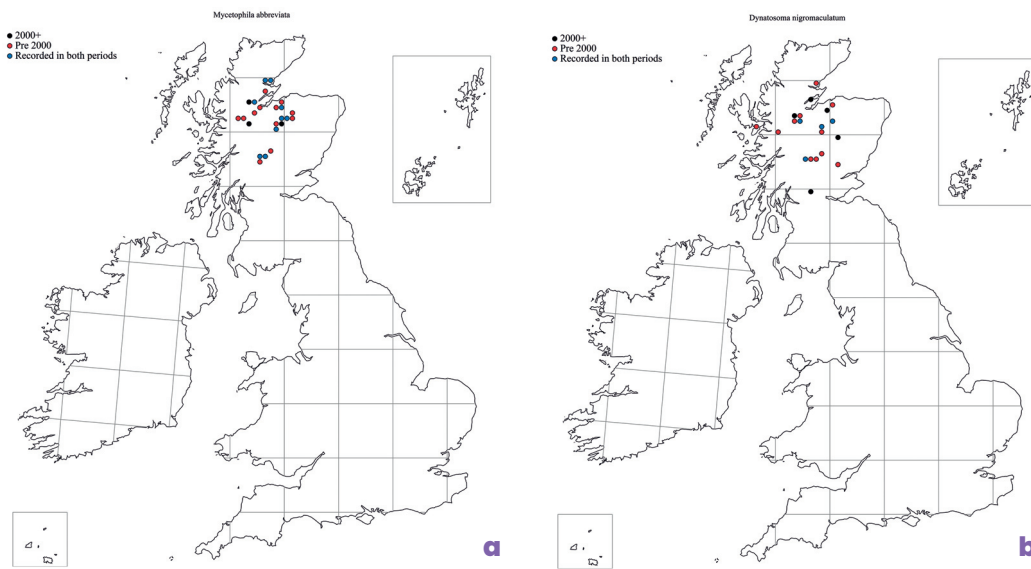


Figure 6. Species only recorded from Scotland: (a) *Mycetophila abbreviata* (24 hectads, 12 with post-2000 records); (b) *Dynatosoma nigromaculatum* (20 hectads, 9 with post-2000 records).

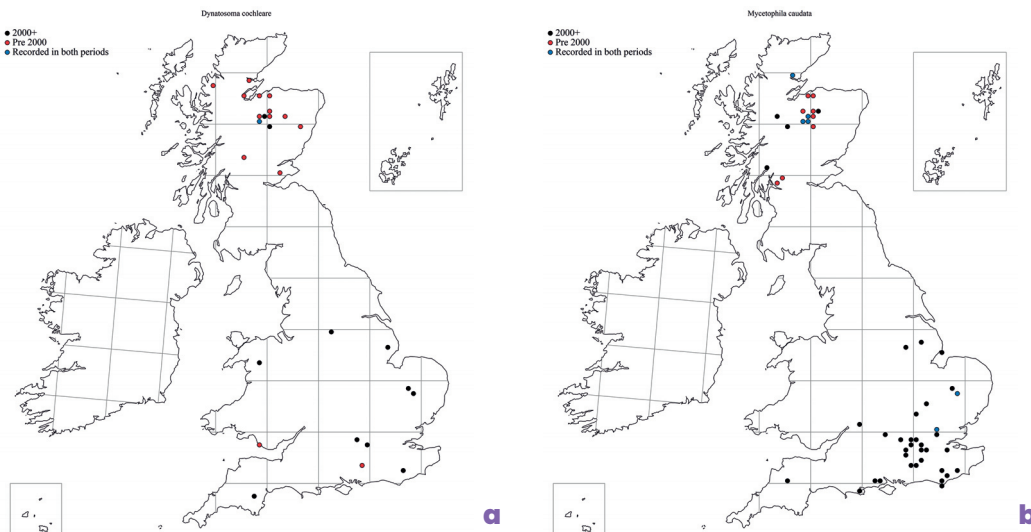


Figure 7. Species that were formerly only recorded from Scotland, but have more recently also been recorded in the south: (a) *Dynatosoma cochleare* with records from 15 hectads in Scotland (records from 1903 to 2012), then scattered across S England (9 hectads from 1990 onwards) and with two records in Wales (south 1999 and north 2020); (b) *Mycetophila caudata* with records more concentrated in SE England (first English record in 1997, now English records from 32 hectads, compared to only 16 hectads with records in Scotland).

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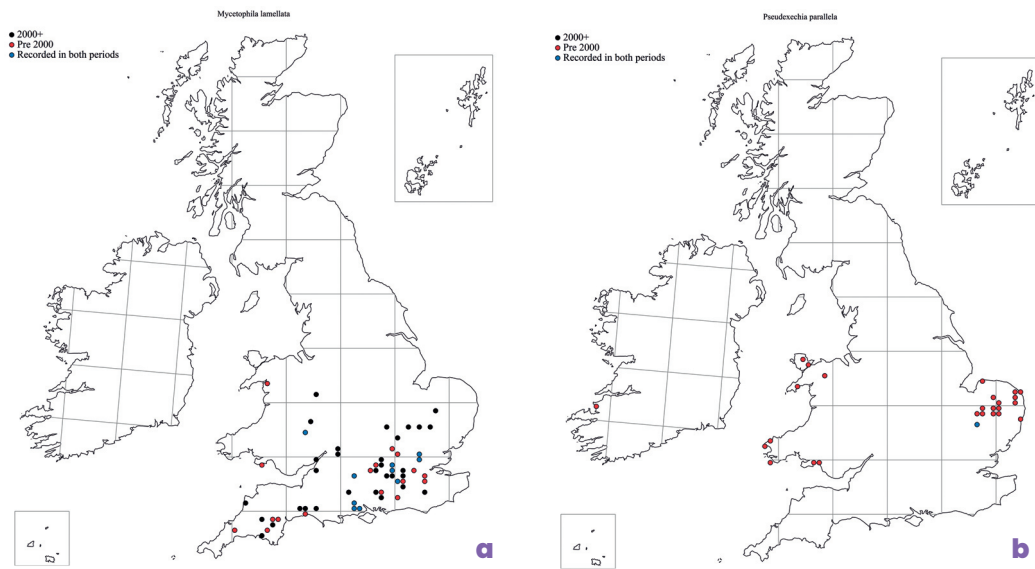


Figure 8. Species with a southern distribution: (a) *Mycetophila lamellata*, widespread in the south (58 hectads); (b) *Pseudexechia parallela*, only recorded in Britain from wetlands in Wales (9 hectads) and East Anglia (16 hectads), and one record in SW Ireland (Co Kerry, 1983).

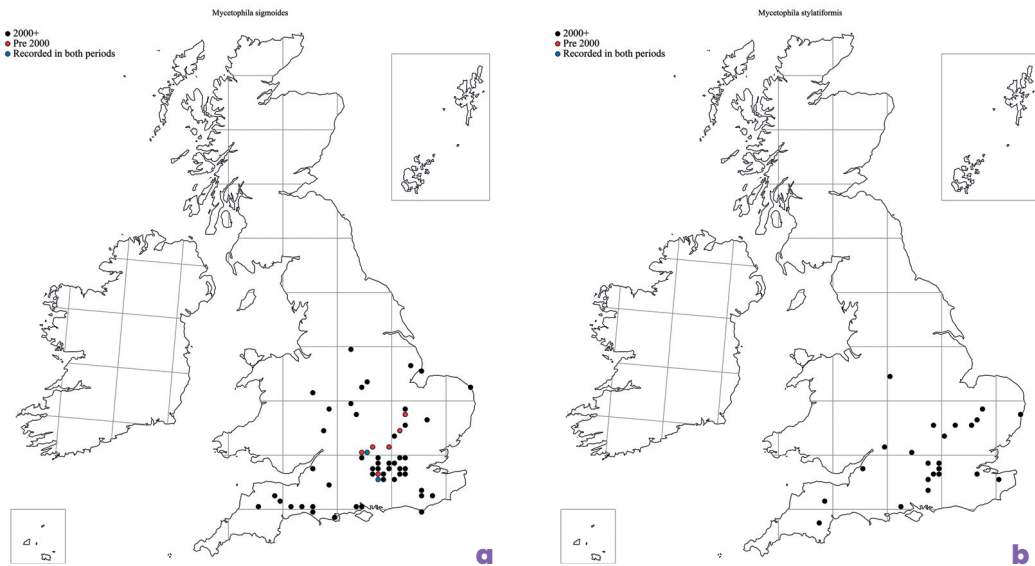


Figure 9. Species that are considered to be new arrivals in Britain, that are now widespread in the south: (a) *Mycetophila sigmoides*, first record 1998, now recorded in 57 hectads north to Yorkshire; (b) *Mycetophila stylatiformis*, first record 2014, now recorded in 23 hectads, the most northerly in Staffordshire in 2018.

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Preparation and identification

Specimens obtained by all the trapping methods mentioned above are usually collected into 70% alcohol. Netted specimens may also be stored in this medium, in which they are more easily identified, as the structure of the genitalia can be seen more clearly in alcohol than in dry specimens. They may then be mounted in various ways for permanent inclusion in collections.

As fungus gnats are more robust than many of the smaller Lower Diptera, specimens collected dry may also be pinned in the same way as many other flies, preferably using a stainless steel micropin inserted in the thorax, taking care to avoid obscuring the diagnostic characters in the bristling of the pleural sclerites. The pinned specimen is secured to a strip of polyporus or plastazote staged on a long pin, to which labels are attached. Specimens too dry for direct pinning can be glued to card triangles.

It will often be necessary to prepare the genitalia of pinned specimens, in which case the whole or terminal part of the abdomen is removed and macerated for a few hours in either potassium (or sodium) hydroxide (KOH, NaOH) or, as preferred by the author, in lactic acid; it is then transferred to distilled water. Hutson *et al.* (1980) used hydroxide, neutralised in glacial acetic acid, before transfer to glycerine in corked tubes attached to the pin; if slide mounting was preferred, they suggested transfer to clove oil before mounting in Canada balsam. For many historic specimens, including those worked on by Edwards, the genitalia were mounted in Canada balsam on strips of celluloid attached to the pin with the insect, but the balsam has darkened, making interpretation of the structure difficult – in a few cases these have been successfully remounted after soaking of the preparation in xylene.

For specimens photographed by Janet Graham for the present work, the abdomen was cleared in KOH and the genitalia were then slide mounted in Euparal. The author has for the past 20 years mounted specimens, both macerated genitalia and entire gnats from alcohol, in dimethyl hydantoin formaldehyde (DMHF), a clear water soluble mountant, and has placed these mounts on round (10 mm diameter) cover slips glued to strips of white card over a round (5 mm diameter) hole that has been cut in the card to enable examination with light transmitted from below. The preparation can then be attached to a pin bearing all parts of the gnat and relevant labels.

Immature stages

Larvae

The larvae of fungus gnats are very variable in form, but generally have a pale-coloured body and a contrasting darker-coloured head. Those of the family Keroplatidae and some subfamilies of Mycetophilidae may be very slender and worm-like in appearance, and many of these live in mucous webs on the surface of fungi, decaying wood or other substrates (Plachter 1979a). Most larvae of Mycetophilinae are slender and more or less cylindrical (Figure 10) and develop within fungus tissue. Exceptions are species of *Phronia* and *Epicypta* which live on the surface of wood-encrusting fungi or rotten wood, and are relatively shorter bodied, more ovoid in dorsal view and often bearing protective cases constructed of frass (excreta) – in some *Phronia* species (e.g. *P. strenua*, as figured by Steenberg 1924) the case is a solid conical structure.



Figure 10. Mycetophilinae, unidentified larva ex *Daedaleopsis confragosa*, dorsal view:
abd sg = abdominal segment; abd spr = abdominal spiracle; pr sp = prothoracic spiracle;
tl sg = terminal segment.

The head (Figure 11) is well-developed and not retractile in the final instar (a difference from the larvae of crane flies), but may be partially retractile in earlier instars (e.g. Figure 13). There is a broad sclerotised capsule dorsally, a pair of short antennae (one-segmented in Mycetophilidae, with three segments in Bolitophilidae and Ditomyiidae), and well-developed mouthparts including pairs of short and broad maxillae and mandibles, each with a toothed inner margin (Figure 12).

The body comprises three thoracic and nine abdominal segments, most of which may bear a pair of ventral protuberances (termed creeping welts), provided with very short spike-like setulae that assist motion over the substrate.

The distribution of spiracles differs between the families of fungus gnats; where present they are small and situated in a median lateral position, one on each side of the respective segment. Mature larvae of Keroplatidae lack functional spiracles (a condition termed as apneustic), while only anterior prothoracic spiracles are developed in the tube-dwelling larvae of Diadocidiidae (propneustic). Ditomyiidae and Bolitophilidae have, in addition to those on the prothoracic segment, spiracles present on abdominal segments 1–8 (peripneustic), which is probably the ground plan condition in Sciaroidea. Larvae of most Mycetophilidae (including all Mycetophilinae) are similar in this

arrangement, except that spiracles are absent on abdominal segment 8 (hemipneustic) (as in Fig. 10) and sometimes also segment 7 before the final instar (as in Fig. 11); the cave-dwelling larva of the sciophiline genus *Speolepta* differs in being propneustic.

Comparative accounts of larval structure for the families and subfamilies of fungus gnats have been provided by several authors (e.g. Madwar 1937, Plachter 1979b), but there has been little recent work on this subject and the larvae of relatively few species have been sufficiently described to enable identification of most larvae at even the generic level. Papers with detailed descriptions of larvae of Mycetophilinae include Steenberg (1924: *Phronia*; 1938: *Epicypta*), Madwar (1937: *Allodiopsis*, *Exechia*, *Exechiopsis*, *Rymosia*, *Cordyla*, *Mycetophila*, *Phronia*, *Trichonta*), Krivosheina and Mamaev (1967: *Allodiopsis*, *Brachypeza*, *Exechia*, *Exechiopsis*, *Rymosia*, *Epicypta*, *Mycetophila*, *Phronia*, *Trichonta*; keys to genera: in Russian), Laštovka (1971, *Mycetophila*; 1972a, *Dynatosoma*, *Platurocypta*) and Plassmann (1972: *Anatella*, *Allodia*, *Allodiopsis*, *Tarnania*, *Mycetophila*; larvae of 11 genera are keyed).



Figure 11. Mycetophilinae, unidentified larva ex *Daedaleopsis confragosa*: (a) head and prothorax including prothoracic spiracles; ventral view; (b) dorsal view.



Figure 12. Mycetophilinae, unidentified larva ex *Daedaleopsis confragosa*: (a), ventral view of mouthparts; (b) dorsal view of prothoracic spiracle.



Figure 13. Mycetophilinae, unidentified immature larva ex *Boletus edulis*: (a) dorsal view; (b) lateral view.

Pupae

Pupae of fungus gnats, as with the larvae, have a distinct head, three thoracic and nine abdominal segments. Otherwise they presage the adult structure by having the impression of compound eyes, and discrete antennal, wing and leg sheaths. A comparative account of pupal structure in the different groups of fungus gnats was provided by Plachter (1979c). Where the fungus host is durable, pupation may take place within the fungus or in a web at the surface of the host, but where decomposition is rapid pupation will be in soil or elsewhere in the substrate. While the pupae of some fungus gnats may be freely suspended in their larval webs, many are enclosed within a silk cocoon and this is true of most Mycetophilinae. Cocoons are usually without any distinct structure but in some *Mycetophila* species the cocoon is of a tougher texture with a separate cap, which is removed as the adult emerges. It is not uncommon for adults to remain within the cocoon for some time after emergence from the pupa.

Association with fungi

Fungus gnats in general include species developing in rotten wood, in bryophytes, in bird's nests and in caves, while there are some Keroplatidae which have predatory web-spinning larvae living on various substrates. The subfamily Mycetophilinae is, however, as far as is known almost exclusively associated with fungus fruiting bodies, with a few species (*Mycetophila adumbrata*, *M. vittipes* and the two *Platurocypta* spp) developing in slime moulds (myxomycetes). These four species have never been reared from fungi and the myxomycete association appears exclusive. There are, nevertheless, some genera, e.g. *Zygomyia* and *Sceptonia*, where the biology is almost unknown, although association with fungal mycelium in decaying vegetation is possible in some cases. **The larval biology of many species (including around half of the species covered in this handbook) is unknown and there is plenty of scope for new observations.**

With some exceptions, members of the tribe Exechiini principally develop in soft and ephemeral fungi, while many of the tribe Mycetophilini develop in tougher or more persistent bracket or wood-encrusting fungi. Known host fungi are stated under the species concerned. A systematic list of fungi is provided in the following section, with the associated species of Mycetophilinae known to develop in them.

Chandler (1978b) included a compilation from the literature of fungus associations of British Diptera, but it was unfortunately not practicable to include references, so that it was not clear either which records were likely to be reliable or which had not previously been published. It was also not possible to distinguish records that related to rearing in Britain from those in other parts of the range of the species concerned.

Jakovlev (1994) extended the coverage of fungus associations to all Palaearctic Diptera and included references for all records, especially useful in covering earlier Russian literature, and also provided a large number of new rearing records from his own work in Karelia. It should be noted that while Jakovlev (*op. cit.*) revised the nomenclature of the

fungi involved, their identification is dependent on the original authors. Also identification of the insects in the earlier literature may not have always been reliable. Where some older records differ from the otherwise known host range, attention is drawn to this.

Chandler (2010b) provided an updated list of fungus associations for British Diptera, in which it was stated whether host records were based on British or foreign rearings. Jakovlev's compilation was invaluable in providing a basis for that list, which was updated from more recent literature and it was indicated where previously unpublished records were included. The principal recent work was by Ševčík (2006, 2010), who gave thorough accounts of his rearings of Diptera from fungi in the Czech Republic and Slovakia, adding many records relevant to the British fauna. Then Jakovlev (2011) reported on his new rearing data of species associated with dead wood and saproxylic fungi in Finland and Russian Karelia, which added rearing records of many species and some genera for which the biology was previously unrecorded. Jakovlev (2012) gave an overview of host associations.

In the account of each species, it is indicated whether rearing records are from the British Isles or elsewhere. For the less frequently reared species all records are listed. In the case of polyphagous species, only additional host fungi are listed for the non-British records. Most rearing records are by continental authors and there are as yet no British rearing records for many species.

Reliable information on the biology of the family in Britain began with the work of Edwards (1925), who covered earlier records, including his own rearings. Little more was done until the work of Buxton (1954, 1960), who carried out a programme of rearing from a wide range of larger fungi and reported on all groups of Diptera that he reared. Trifourkis (1977) did a similar study, concentrating particularly on Mycetophilidae. His thesis also covered larval structure and biology, but remains unpublished. Chandler (1993b) reported the rearings in Britain by R.E. Evans, which provided some additional records, a paper that appeared too late to be cited by Jakovlev (*op. cit.*). In recent years Judy Webb has been rearing Diptera from fungi; Chandler (2010b) included some of her previously unpublished records. Also Richard Fortey has for several years been rearing from fungi collected in his wood, and his results have now been published (Fortey and Chandler 2021), including the first host records for several species of Mycetophilinae.

As far as British rearing records are concerned, these are for the most part considered reliable as the main contributions have involved submission of samples to mycologists – by Edwards to J. Ramsbottom, and by Buxton to R.W.G. Dennis and D. Reid. The rearings by Reg Evans, Judy Webb and Richard Fortey benefited from their own mycological knowledge.

Rearing techniques were described by Chandler (2010b), where the method devised by Judy Webb, using moist coir fibre as a pupation medium is preferred. While many Diptera develop in decaying fungi, larvae of Mycetophilidae require living fungus tissue, which must be considered when rearing. Since soft fungi begin to decompose more rapidly after removal from the mycelium, it is preferable to collect them when larvae are nearly mature and to remove a decomposing fungus from a rearing container after larvae have emerged. It is important to isolate each sample when several are collected on one day to avoid cross-contamination. Accurate identification of fungi is essential for rearing

records to be of value – there are many literature records where no identification or an incorrect one had been made.

Care should be taken to restrict the quantity of fungi collected for rearing, especially for rarer fungus species. The commercial collection of fungi has not generally been considered detrimental to the conservation of the fungi, although it is now being prohibited at certain sites regarded as important for rare fungi, but removal of a significant proportion of available fruiting bodies potentially has an effect on the conservation of the associated insects.

Systematic list of fungus hosts

This list is restricted to fungi from which species in the subfamily Mycetophilinae have been reared, so excludes those fungi from which only fungus gnats of other subfamilies and families, or Diptera belonging to other families, have been reared.

All fungi for which there are British or European rearing records are listed in alphabetical order of families, genera and species. Compilation of this list has been brought up to date using the nomenclature and classification adopted in the online database Index Fungorum (www.indexfungorum.org), based at the Royal Botanic Gardens, Kew (revised, to take into account recent changes, on 4 September 2021).

Where a different name is used by Jakovlev (1994), or in more recent literature concerning development of fungus gnats, the alternative name is also given here; where the generic assignment of a fungus has changed but the species name is unchanged this is indicated as “(ex the previous generic name)”. All species of fungi for which there are rearing records are listed under each fungus genus. For larger fungus genera the Mycetophilinae known to be associated with them are grouped together; the host records for individual species of the fungus genus are cited in the text for each species of gnat.

Where one or a few species of a mycetophiline genus are recorded from a fungus these are listed individually, but if several or many species of a genus or subgenus are recorded from that genus of fungi only the genus or subgenus is given in the case of records from outside the British Isles. However, in the case of the genus *Mycetophila* all species are listed, as the range of fungus hosts differs between groups within the genus.

For British rearing records the specific name of the fungus is in **bold** type and the full name of the insect is also in **bold** type, with the species name always stated. Where gnats in bold type are listed within square brackets following the generic name this indicates that other species of the genus have also been recorded from this genus of fungi, but only those that have been reared in Britain are listed.

There are rearing records for 165, or almost half, of the British species of Mycetophilinae. Of these only 95 species have been reared in Britain, while 143 have been reared in other parts of their range, so for 22 species there are only British rearing records. The hosts

listed include 440 species of fungi and 6 species of myxomycetes, of which 214 species of fungi and 5 of myxomycetes relate to British records. **These totals indicate how much scope there is for adding new information on the biology of fungus gnats. Even many common species have yet to be reared.**

Phylum BASIDIOMYCOTA

AGARICOMYCETES – AGARICOMYCETIDAE

AGARICALES

AGARICACEAE

Agaricus campestris *Exechia nigroscutellata*

Apioperdon pyriforme (ex Lycoperdon)

Brachypeza bisignata

Chamaemyces **fracidus** *Mycetophila fungorum*

Chlorophyllum **rhacodes** (ex Lepiota, ex Macrolepiota)

Allodia lugens, Exechia fusca, Mycetophila fungorum

Coprinus ? sp.

Synplasta gracilis [requires confirmation, see below].

British records of *Pseudexechia trivittata* visiting Coprinus spp. on dung will relate to genera split from Coprinus, which are now placed in Psathyrellaceae

Cystoderma amianthinum *Allodiopsis domestica, Exechia fusca*

Echinoderma asperum (= Lepiota acutesquamosa)

Allodiopsis domestica

Lepiota (L. clypeolaria, L. cristata, L. **erminea** (= L. alba))

Allodia, Brachycampta, Allodiopsis domestica, Exechia [E. fusca], Mycetophila fungorum, Rymosia affinis

Leucoagaricus leucothites (= L. pudicus auct.)

Exechia fusca

? Lycoperdon sp.

Trichonta venosa

Macrolepiota **excoriata** *Allodiopsis rustica, Cordyla brevicornis*

Macrolepiota **procera** *Allodia, Allodiopsis rustica, Exechia [E. dorsalis, E. seriata], Rymosia, Tarnania, Mycetophila fungorum*

Phaeolepiota **aurea** (ex Pholiota)

Allodiopsis domestica, Exechia fusca, Tarnania fenestralis

AMANITACEAE

Amanita (A. ceciliae (= A. strangulata auct.), A. **citrina**, A. excelsa (= A. spissa), A. fulva, A. gemmata, A. **muscaria**, A. pantherina, A. phalloides, A. porphyria, A. **rubescens**, A. **vaginata**, A. verna, A. virosa)

Allodia [A. ornaticollis], Brachycampta, Anatella minuta (?), *Brevicornu sericornu, Cordyla [C. brevicornis], Exechia [E. bicincta, E. dorsalis, E. fusca, E. spinuligera], Exechiopsis* (s.s.) (?), *Rymosia [R. affinis], Mycetophila alea, M. britannica, M. fungorum, M. ichneumonea, M. luctuosa, M. ocellus, M. perpallida*

Limacelopsis **guttata** (ex Limacella)

Allodiopsis rustica, Mycetophila fungorum

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BOLBITIACEAEConocybe (C. aporos, C. **tenera**)*Allodia*, **Exechia fusca****CLAVARIACEAE**Clavulinopsis **helvola** (= C. inaequalis auct.)**Rymosia fasciata****CORTINARIACEAE**

Cortinarius (C. alborufescens, C. alboviolaceus, C. armeniacus, C. armillatus, C. **basiroseus**, C. brunneus, C. (= Rozites) caperatus, C. cinnamomeus, C. cinnamomeoluteus, C. collinitus, C. cotoneus, C. cumatilis, C. depressus, C. elatior, C. **fulgens**, C. gentilis, C. **hinnuleus**, C. malicorius (= C. croceoconus), C. mucosus, C. purpureus (= Dermocybe phoenicea), C. romagnesii, C. saturninus, C. **semisanguineus**, C. traganus, C. triumphans (= C. crocolitus), C. trivialis, C. **torvus**, C. violaceus)

Allodia [**A. lugens**, **A. ornatcollis**], *Brachycampta* [**B. czernyi**], *Allodiopsis domestica*, *Brachypeza armata*, *Brevicornu griseicollis* (?), *Cordyla brevicornis*, **Exechia dorsalis**, *E. fusca*, *E. separata*, *Myrosia*, *Rymosia*, **Tarnania fenestralis**, *T. tarnanii*, **Mycetophila britannica**, *M. fungorum*, *M. ichneumonea*, *M. luctuosa*, *M. ocellus*, *M. uninotata*

CREPIDOTACEAECrepidotus (C. **mollis**, C. ?sp.)

Allodia ornatcollis, *Brachycampta alternans*, *B. grata*, *Mycetophila ruficollis*

CYPHELLACEAEChondrostereum **purpureum**

Brevicornu sericoma, **Mycetophila luctuosa**, *M. ocellus*, *M. ornata*, *Phronia humeralis*

ENTOLOMATACEAEClitopilus geminus (ex Rhodocybe) *Sceptonia flavipuncta*Entoloma (E. **clypeatum**, E. **hirtipes**, E. **jubatatum**, E. saundersii, E. sinuatum (= Rhodophyllus lividus))

Allodia [**A. ornatcollis**], *Brachycampta*, *Allodiopsis domestica*, *Exechia dorsalis*, *E. fusca*, *Rymosia affinis*, *R. spinipes*, **Tarnania fenestralis**, *T. tarnanii*, **Mycetophila britannica**, *M. fungorum*, *M. ichneumonea*, *M. ruficollis*

FISTULINACEAEFistulina **hepatica***Brachycampta grata*, **Mycetophila marginata**, *M. ornata***HYDNANGIACEAE**Laccaria (L. **amethystina**, L. **laccata**)

Allodia [**A. lugens**, **A. ornatcollis**], *Brachycampta*, *Exechia* [**E. dorsalis**], *Exechiopsis* (s.s.) **fimbriata**, *Rymosia spinipes*, **R. virens**

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HYGROPHORACEAE

Ampulloclitocybe clavipes (ex Clitocybe)

Allodiopsis domestica, *A. rustica*

Arrhenia (= Omphalina) sphagnicola

*Exechia fusca*Cuphophyllus (*C. fornicatus*, *C. virgineus*)*Allodia ornaticollis*, *Exechia fusca*Hygrocybe (*H. chlorophana*, *H. coccinea*, *H. conica* (= *H. nigrescens* auct.), *H. quieta*)*Allodia ornaticollis*, *Exechia fusca*, *E. spinuligera*, *Rymosia affinis*,
*Tarnania dziedickii*Hygrophorus (*H. camarophyllus*, *H. eburneus*, *H. erubescens*, *H. olivaceoalbus*, *H. persicolor*,
H. persoonii (= *H. dichrous*), *H. russula*)*Allodia*, *Allodiopsis domestica*, *Cordyla flaviceps*, *Exechia dorsalis*, *E. dizona*, *E. fusca*, *E. seriata*, *Rymosia affinis*, *R. setiger*,
Tarnania tarnanii, *Mycetophila alea*, *M. fungorum*,
M. ichneumonea, *M. signatoides***HYMENOGASTRACEAE**Galerina marginata *Allodia*, *Brachycampta*, *Exechia*, *Rymosia fasciata*Gymnopilus junonius *Brachycampta grata*, *Mycetophila ichneumonea*Gymnopilus penetrans *Allodia lugens*Hebeloma (*H. crustuliniforme* s.l. (= *H. radicum*), *H. laterinum*, *H. mesophaeum*
(= *H. strophosum*), *H. pallidoluctuosum*, *H.* (= *Naucoria*) *pseudoamarescens*, *H. sacchariolens*)*Allodia* [*A. lugens*, *A. ornaticollis*], *Brachycampta* [*B. grata*],
Allodiopsis, *Brevicornu griseicolle*, *Exechia* [*E. dorsalis*, *E. fusca*],
Pseudexechia trisignata, *Tarnania* [*T. fenestralis*], *Mycetophila*
alea, *M. britannica*, *M. fungorum*, *M. ichneumonea*, *M. marginata*,
M. ruficollis, *M. sepulta*Psilocybe bohemica *Exechia fusca***INOCYBACEAE**Inocybe (*I. albomarginata*, *I. asterospora*, *I. bongardii*, *I. flocculosa* (= *I. lucifuga*), *I. fraudans*,
I. incarnata, *I. geophylla*, *I. godeyi*, *I. griseoililacina*, *I. lacera*, *I. mixtilis*, *I. nitidiuscula* (= *I. friesii*))*Allodia* [*A. ornaticollis*, *A. truncata*], *Brachycampta*, *Exechia*
[*E. dorsalis*, *E. fusca*], *Rymosia bifida*, *R. spinipes*, *Tarnania*
tarnanii, *Mycetophila fungorum*, *M. ichneumonea*, *M. ruficollis*Inosperma (*I. cervicolor*, *I. cookei*, *I. erubescens* (= *I. patouillardii*))*Allodia ornaticollis*, *Exechia fusca*, *E. lucidula*Pseudosperma rimosum (ex Inocybe, = *I. fastigiata*)*Allodia ornaticollis*, *Exechia fusca*, *Mycetophila fungorum***LYOPHYLLACEAE**Calocybe gambosa *Allodia*, *Brachycampta*, *Allodiopsis domestica*, *Exechia*
[*E. neorepanda*], *Mycetophila strigata*Calocybe gangraenosa (= *Lyophyllum fumatofoetens*)*Mycetophila perpallida*

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Leucocybe connata (ex *Lyophyllum*)

Brachycampta alternans, *Allodiopsis rustica*

Lyophyllum (*L. decastes* (= *Tricholoma aggregatum*), *L. loricatum*)

Brachycampta alternans, *Exechia neorepanda*, *Tarnania tarnanii*,
Mycetophila fungorum, *M. strigatoides*

Tricholomella constricta (= *Tricholoma leucocephalum*)

Allodia ornaticollis

MARASMIACEAE

Marasmius oreades (= *M. caryophylleus*)

Allodia, *Allodiopsis domestica*, *Notolopha cristata*

Megacollybia platyphylla *Allodia*, *Brachycampta* [*B. grata*], *Exechia bicincta*, *E. macula*,
Notolopha cristata, *Mycetophila britannica*, *M. fungorum*,
M. ichneumonea, *M. ruficollis*

Pleurocybella porrigens *Mycetophila marginata*, *M. ocellus*

MYCENACEAE

Mycena (*M. crocata*, *M. galericulata*, *M. haematopus*, *M. inclinata*, *M. pelianthina*, *M. pura*,
M. tintinnabulum)

Allodia [*A. ornaticollis*, *A. lugens*], *Brachycampta*, *Exechia*
[*E. bicincta*, *E. fusca*], *Exechiopsis* (s.s.), *Mycetophila dentata*,
M. ichneumonea, *M. ruficollis*

Xeromphalina sp. *Mycetophila ichneumonea*

OMPHALOTACEAE

Gymnopus (*G.* (ex *Collybia*) *androsaceus*, *G. dryophilus*, *G. erythropus* (ex *Marasmius*, =
Collybia acervata), *G. fusipes*, *G. ocior*)

Allodia truncata, *Brachycampta*, *Allodiopsis*, *Cordyla fasciata*, *Exechia*
[*E. dorsalis*, *E. fusca*], *Mycetophila alea*, *M. britannica*, *M. fungorum*,
M. ichneumonea, *M. ruficollis*, *M. uninotata*

Marasmiellus (ex *Collybia*) **confluens**

Exechia fusca

Omphalotus olearius *Brachycampta*, *Allodiopsis domestica*, *Exechia bicincta*,
Tarnania dziedickii

Rhodocollybia (ex *Collybia*) (*R. butyracea* (= *Collybia asema*), *R. maculata*, *R. prolixa*)

Allodia [*A. ornaticollis*], *Brachycampta*, *Allodiopsis*, *Cordyla*
fasciata, *Exechia* [*E. dorsalis*, *E. fusca*], *Tarnania tarnanii*,
Mycetophila fungorum, *M. ichneumonea*, *M. ruficollis*, *M. uninotata*

NIDULARIACEAE

Crucibulum laeve *Exechia fusca*

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PHYSALACRIACEAE

Armillaria (A. borealis, A. gallica (= A. bulbosa auct.), A. **mellea**)

Allodia [**A. lugens**, **A. ornaticollis**], *Brachycampta*, *Brachypeza radiata*, *Exechia* [**E. fusca**], *Tarnania*, **Mycetophila britannica**, **M. fungorum**, *M. luctuosa*, *M. marginata*, **M. perpallida**, **M. ruficollis**, *M. spectabilis*

Cylindrobasidium (C. laeve, C. **evolvens**)**Mycetophila ocellus**, *Zygomyia pictipennis*

Flammulina **velutipes** *Allodia lugens*, **Exechia fusca**, *Tarnania fenestralis*, *Mycetophila fungorum*, **M. marginata**, *M. ruficollis*

Hymenopellis **radicata** (ex *Xerula*, *Collybia*)**Exechia fusca**Mucidula (ex *Oudemansiella*) **mucida**

Allodia ornaticollis, **Exechia bicincta**, *E. fusca*, **Mycetophila perpallida**

PLEUROTACEAE

Hohenbuehelia petaloides

*Mycetophila subsigillata*Pleurotus (P. **cornucopiae**, P. **dryinus** (= P. corticatus), P. **ostreatus**, P. pulmonarius)

Brachypeza (all species) [**B. armata**, **B. bisignata**, **B. radiata**], *Exechia bicincta*, **Synplasta gracilis**, *Tarnania fenestralis*, **Mycetophila britannica**, *M. dentata*, *M. fungorum*, **M. ichneumonea**, *M. luctuosa*, **M. marginata**, *M. ocellus*, **M. ornata**, *M. spectabilis*

PLUTEACEAE

Pluteus (P. **cervinus**, P. **salicinus**)

Allodia [**A. ornaticollis**], *Brachycampta* [**B. grata**], *Exechia* [**E. bicincta**, **E. fusca**, **E. spinuligera**], **Mycetophila fungorum**, **M. perpallida**, *M. ruficollis*, **Phronia braueri**

PSATHYRELLACEAE

Coprinopsis **atramentaria****Myrosia maculosa**Coprinellus radians *Pseudexechia trivittata*Homophron spadiceum (ex *Psathyrella*)*Rymosia bifida*Lacrymaria **lacrymabunda** (ex *Psathyrella*)**Exechia fusca**Parasola **conopilea** (ex *Psathyrella*)**Pseudexechia trivittata**, **P. tuomikoskii**Psathyrella (P. **candolleana**, P. **microrhiza**, P. **piluliformis**, P. **spadiceogrisea** (= P. **vernalis**))

Allodia lugens, **A. ornaticollis**, **Exechia fusca**, **E. separata**, **Pseudexechia trivittata**, **P. tuomikoskii**, *Mycetophila fungorum*, **M. ocellus**

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SARCOMYXACEAE

Sarcomyxa **serotina** (= *Panellus serotinus*)

Allodia lugens, *Dynatosoma nigromaculatum*, *Mycetophila ocellus*

STROPHARIACEAE

Agrocybe (A. **pediades** (= *A. semiorbicularis*), *A. praecox*, *A. rivulosa*)

Allodia [***A. ornatcollis***], *Brachycampta*, *Exechia*, ***Mycetophila fungorum***

Bogbodia uda (ex *Hypholoma*)

Exechia parva

Hypholoma (*H. capnoides*, *H. elongatum*, *H. fasciculare*)

Allodia ornatcollis, *Cordyla fusca*, *Exechia* [***E. contaminata***, ***E. spinuligera***], *Notolopha cristata*, ***Mycetophila britannica***, ***M. ruficollis***, ***M. sepulta***

Kuehneromyces mutabilis

Brachycampta barbata, *Exechia*, ***Pseudexechia trisignata***

Leratiomyces (*L. ceres* (= *Stropharia aurantiaca* auct.), *L. squamosus*)

Exechia fusca

Pholiota (*P. aurivella* (= *P. cerifera* auct.), *P. squarrosa*, *P. vernalis*)

Allodia ornatcollis, *Brachycampta czernyi*, *B. neglecta*, *Anatella minuta* (?), *Cordyla brevicornis*, *Exechia dorsalis*, ***E. fusca***, *E. lucidula*, *E. seriata*, ***Tarnania fenestralis***, ***Mycetophila britannica***, ***M. fungorum***, *M. ichneumonea*, *M. marginata*, *M. ocellus*, *M. ruficollis*

Stropharia (*S. cyanea*, *S. hornemannii*)

Allodia, *Exechia* [***E. fusca***], *Notolopha cristata*, *Mycetophila fungorum*, *M. ichneumonea*

TAPINELLACEAE

Tapinella atrotomentosa (ex *Paxillus*)

Mycetophila signatoides

TRICHOLOMATACEAE

Aspropaxillus giganteus (ex *Leucopaxillus*)

Allodiopsis domestica, *Exechia seriata*

Atractosporocybe inornata (ex *Clitocybe*)

Allodiopsis domestica

Clitocybe (*C. costata*, *C.icolor*, *C. infundibuliformis*, *C. phaeophthalma* (= *C. hydrogramma* auct.), *C. nebularis*, *C. odora*, *C. squamulosa*, *C. rivulosa* (= *C. dealbata*), *C. vibecina*)

Allodia, *Allodiopsis* [***A. domestica***, ***A. rustica***], *Exechia* [***E. fusca***], *Tarnania* [***T. fenestralis***, ***T. nemoralis***], *Mycetophila alea*, ***M. britannica***, *M. ichneumonea*, ***M. luctuosa***

Infundibulicybe (ex *Clitocybe*) (*I. geotropa*, *I. gibba*)

Allodiopsis [***A. domestica***, ***A. rustica***], *Brachypeza bisignata*, *Tarnania* [***T. fenestralis***], ***Exechia fusca***, *E. pectinivalva*, *Mycetophila luctuosa*

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Lepista (L. glaucocana, L. **nuda**, L. sordida)*Allodiopsis* [**A. domestica**, **A. rustica**], *Exechia* [**E. fusca**],
Mycetophila fungorum, *M. ichneumonea*, ***Tarnania fenestralis***Leucocortinariarius bulbiger *Brachycampta grata*, *Allodiopsis domestica*Melanoleuca (M. brevipes, M. **grammopodia**, M. **melaleuca**)*Allodia* [**A. ornaticollis**], *Allodiopsis*, *Exechia*, *Tarnania* [**T. fenestralis**],
*Mycetophila fungorum*Omphalina pyxidata *Mycetophila fungorum*

Paralepista flaccida (ex Lepista, = Clitocybe inversa)

Brachycampta alternans, *B. czernyi*, *Allodiopsis domestica*,
A. rustica, *Exechia neorepanda*, *E. parva*, *E. separata*

Porpoloma macrorrhizum (= Leucopaxillus macrocephalus)

*Cordyla murina*Tricholoma (T. album, T. **argyraceum** (= T. inocybeoides), T. **columbetta**, T. fulvum
(= T. flavobrunneum), T. equestre (= T. flavovirens), T. **orirubens**, T. populinum, T. portentosum,
T. **saponaceum**, T. **scalpturatum**, T. sejunctum, T. **sulphureum**, T. **terreum**, T. virgatum)*Allodia*, *Brachycampta*, *Allodiopsis*, *Exechia* [**E. dorsalis**, **E. fusca**],
Exechiopsis (s.s.) [**E. intersecta**], *Notolopha cristata*, *Pseudorymosia*
fovea, *Rymosia* [**R. fasciata**], *Tarnania* [**T. fenestralis**], *Mycetophila*
fungorum, *M. ichneumonea*, *M. marginata*, *M. spectabilis*Tricholomopsis (T. decora, T. **rutilans**)*Allodia*, *Brachycampta*, *Exechia seriata*, ***Mycetophila finlandica***,
M. fungorum, *M. ichneumonea*, *M. ruficollis*

TUBARIACEAE

Tubaria **confragosa***Allodia*, *Brachycampta*, ***Exechia fusca***, *Mycetophila evanida*,
M. fungorum, *M. ichneumonea*

INCERTAE SEDIS

Panaeolus **papilionaceus** (= P. campanulatus, P. sphinctrinus)***Allodia lugens***, ***A. ornaticollis***, ***Exechia fusca***, ***E. spinuligera***,
Pseudexechia trivittata, *Mycetophila fungorum*

BOLETALES

BOLETACEAE

Boletus (incl. Xerocomus) (B. aereus, B. **edulis**, B. pinophilus (= B. pinicola), B. reticulatus)*Allodia zaitzevi*, *Cordyla brevicornis*, *C. fasciata*, *C. pusilla*, *Exechia*
fusca, *E. separata*, ***Mycetophila britannica***, ***M. fungorum***,
M. perpallida, *M. signatoides*, *M. spectabilis*

Caloboletus calopus (ex Boletus)

Mycetophila signatoides

Chalciporus piperatus (ex Suillus)

Brachycampta czernyi, *Exechia separata*

Hemileccinum impolitum (ex Boletus)

Cordyla brevicornis, *Exechia bicincta*, *Mycetophila idonea*

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Hortiboletus **rubellus** (ex Boletus, = B. versicolor)

Exechia fusca, *E. separata*, *E. spinuligera*

Imleria **badia** (ex Boletus) *Exechia dorsalis*, *Mycetophila perpallida*

Imperator torosus (ex Boletus)

Cordyla murina

Leccinum (L. aurantiacum, L. leucophaeum, L. **scabrum**, L. versipelle, L. vulpinum)

Allodia, *Brachycampta*, *Cordyla flaviceps*, *C. fusca*, *Exechia separata*, *Mycetophila dentata*, *M. fungorum*, ***M. perpallida***, *M. signatoides*

Rubroboletus satanas (ex Boletus)

Mycetophila spectabilis

Suillellus **luridus** (ex Boletus)

Mycetophila signatoides

Tylopilus felleus

Mycetophila fungorum

Xerocomellus (ex Boletus, Xerocomus) (X. **chrysenteron**, X. **porosporus**, X. **pruinatus**)

Brachycampta alternans, ***B. grata***, ***Exechia fusca***, *Mycetophila fungorum*, ***M. perpallida***, *M. signatoides*

Xerocomus **subtomentosus** (ex Boletus)

Allodia ornaticollis, *Exechia bicincta*, *E. fusca*, *E. separata*, *Exechiopsis* (s.s.) *indecisa*, *Mycetophila confluens*, ***M. perpallida***, ***M. signatoides***

CONIOPHORACEAE

Coniophora **puteana** ***Mycetophila lunata***, ***M. ocellus***

Penttilamyces romellii (ex Leucogyrophana)

Mycetophila bohémica

GOMPHIDIACEAE

Chroogomphus **rutilus** (ex Gomphidius viscidus)

Exechia bicincta, ***E. separata***, ***Mycetophila ocellus***

Gomphidius **glutinosus** *Allodia*, *Cordyla murina*, ***Exechia separata***

GYROPORACEAE

Gyroporus sp.

Exechia dorsalis, *Mycetophila alea*

HYGROPHOROPSIDACEAE

Hygrophoropsis **aurantiaca**

Allodia lugens, *Brachycampta alternans*, *B. grata*, ***Allodiopsis rustica***, *Exechia bicincta*, *E. cincta*, *E. fusca*, *Mycetophila blanda*, *M. lunata*

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PAXILLACEAEGyrodon lividus *Mycetophila signatoides*Paxillus (P. **involutus**, P. rubicundulus)*Allodia*, *Brachycampta* [**B. grata**], *Anatella minuta* (?), *Exechia confinis*, *Mycetophila fungorum*, **M. luctuosa**, **M. marginata**, **M. signatoides****SCLERODERMATACEAE**Scleroderma verrucosum *Cordyla murina***SUILLACEAE**Suillus (S. **bovinus**, S. cavipes (ex Boletinus), S. **granulatus**, S. **flavidus**, S. **grevillei**, S. luteus, S. variegatus)*Allodia* [**A. ornaticollis**], *Brachycampta* *Cordyla*, *Exechia* [**E. separata**, **E. seriata**], *Exechiopsis* (s.s.) *clypeata*, **E.** (s.s.) **indecisa**, *Synplasta gracilis*, *Mycetophila alea*, *M. confluens*, **M. fungorum**, *M. signata***AGARICOMYCETES – PHALLOMYCETIDAE****GOMPHALES****CLAVARIADELPHACEAE**Clavariadelphus truncatus *Mycetophila hetschkoi***GOMPHACEAE**

Ramaria (R. aurea, R. flavescens, R. formosa)

Rymosia setiger, *Tarnania fenestralis*, *T. tarnanii*, *Mycetophila hetschkoi***PHALLALES****PHALLACEAE**Phallus impudicus *Mycetophila fungorum* group (not named to species), *M. marginata***AGARICOMYCETES – INCERTAE SEDIS****AURICULARIALES****AURICULARIACEAE**Exidia cartilaginea *Brachycampta foliifera*Exidia glandulosa *Anatella lenis*Exidia repanda *Trichonta subfusca***CANTHARELLALES****BOTRYOBASIDIACEAE**Botryobasidium **aureum** *Exechiopsis* (*Xenexechia*) **leptura****CANTHARELLACEAE**Cantharellus cibarius *Mycetophila fungorum*

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CORTICIALES**CORTICIACEAE**? *Corticium* **sp.***Phronia humeralis*, *Trichonta melanura*, *T. terminalis***HYMENOCHAETALES****HYMENOCHAETACEAE***Asterodon ferruginosus* *Cordyla murina*, *Exechiopsis* (s.s.) *pulchella*, *E.* (s.s.) *subulata*,
Pseudorymosia fovea, *Mycetophila lubomirskii**Inonotus cuticularis* ***Mycetophila tridentata****Mensularia radiata* (ex *Inonotus*)*Dynatosoma fuscicorne*, ***Mycetophila ornata****Phellinopsis conchata* (ex *Phellinus*)*Brevicornu serenum**Phellinus pomaceus****Mycetophila uliginosa*****SCHIZOPORACEAE***Schizopora paradoxa* (*Schizophora* error: = *Hyphodontia*)*Epicypta fumigata*, ***Mycetophila marginata***, ***M. ocellus***, ***M. pictula***,
Trichonta vitta

?family

Trichaptum abietinum *Dynatosoma reciprocum*, *Trichonta flavicauda**Trichaptum laricinum* *Trichonta flavicauda***POLYPORALES****DACRYOBOLACEAE***Cyanosporus caesius* (ex *Postia*)*Dynatosoma fuscicorne**Postia tephroleuca****Dynatosoma thoracicum***, ***Mycetophila autumnalis*****FOMITOPSIDACEAE***Antrodia* spp *Cordyla parvipalpis*, *Exechia fusca**Climacocystis borealis* *Dynatosoma fuscicorne**Daedalea quercina* ***Dynatosoma fuscicorne****Fomitopsis betulina* (ex *Piptoporus*)***Dynatosoma fuscicorne***, *Mycetophila dentata*, ***M. forcipata***,
M. luctuosa*Fomitopsis pinicola* *Dynatosoma fuscicorne*, *Mycetophila sigmoides***GLOEOPHYLLACEAE***Neolentinus lepideus* *Allodia lundstroemi*, *Mycetophila fungorum*, *M. luctuosa*, *M. signata***GRIFOLACEAE***Grifola frondosa****Dynatosoma fuscicorne***, ***Mycetophila cingulum***

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*INCRUSTOPORIACEAE*Tyromyces chioneus *Dynatosoma thoracicum, Mycetophila mohilevensis**IRPICACEAE*Byssomerulius **corium** *Mycetophila formosa*Vitroporus dichrous (ex Gloeoporus)
*Trichonta vitta**LAETIPORACEAE*Laetiporus **sulphureus** *Mycetophila tridentata**MERIPILACEAE*Meripilus **giganteus** *Allodia lugens, Exechia dorsalis, Mycetophila ornata, M. luctuosa*Rigidoporus **sanguinolentus** (ex Physisporinus)
*Mycetophila unipunctata**MERULIACEAE*Mycoacia (= Ceriporiopsis) **gilvescens**
*Mycetophila lamellata*Mycoacia **uda** *Synplasta gracilis, Mycetophila ocellus*Phlebia **radiata** *Mycetophila formosa, M. ocellus*Phlebia **tremellosa** (ex Merulius)
*Dynatosoma fuscicorne, Mycetophila ocellus*Physisporinus **vitreus** *Mycetophila fraterna*Sarcodontia **crocea** *Mycetophila ocellus**PHANEROCHAETACEAE*Bjerkandera **adusta** *Dynatosoma fuscicorne, Mycetophila marginata, M. ocellus, M. ornata, M. trinotata**PODOSCYPHACEAE*Abortiporus (= Heteroporus) **biennis**
*Dynatosoma fuscicorne**POLYPORACEAE*Cerioporus (ex Polyporus) (C. leptcephalus, C. **squamosus**)
*Brachycampta grata, Dynatosoma fuscicorne, Mycetophila britannica, M. cingulum, M. dentata, M. forcipata, M. fungorum, M. luctuosa, M. ornata*Cerioporus (ex Datronia) **mollis***Trichonta girschneri*Daedaleopsis **confragosa** *Dynatosoma fuscicorne, Mycetophila dentata, M. sigmoides*Fomes fomentarius *Dynatosoma nigromaculatum*

PENIOPHORACEAE

Baltazaria (ex Scytinostroma) galactina

Exechiopsis (s.s.) *pulchella*, *Mycetophila dziedickii*Peniophora (P. **cinerea**, P. **incarnata**)*Trichonta terminalis*

Peniophora laurentii

Trichonta hamata

RUSSULACEAE

Lactarius (L. **acerrimus**, L. blennius, L. camphoratus, L. chrysorrheus, L. **deliciosus**, L. deterrimus, L. fulvissimus, L. glyciosmus, L. helvus, L. pallidus, L. pilatii, L. pubescens, L. quieticolor (= L. hemicyaneus), L. **quietus**, L. resimus, L. **rufus**, L. salmonicolor, L. semisanguifluus, L. **subdulcis**, L. **tabidus** (= L. theiogalus), L. **terminosus**, L. trivialis, L. **turpis** (= L. necator auct., L. plumbeus auct.), L. zonarius (= L. insulsus))

Allodia [**A. lugens**], *Brachycampta alternans*, *Allodiopsis domestica*, *Anatella minuta* (?), *Cordyla* (most species), *Exechia* (several species: **E. contaminata**, **E. nigroscutellata**, **E. fusca**), *Exechiopsis* (s.s.) *indecisa*, **Tarnania fenestralis**, *Mycetophila alea*, **M. blanda**, **M. britannica**, *M. confluens*, *M. czizekii*, *M. evanida*, *M. fungorum*, **M. ichneumonea**, **M. luctuosa**, **M. sepulta**, *M. signata*, **M. signatoides**, *M. stylata*, *M. uninotata*

Lactifluus (ex Lactarius) (L. **piperatus**, L. **vellereus**, L. **volemus** (= L. ichoratus))

Brachycampta alternans, *Cordyla fasciata*, *Exechia confinis*, *E. seriata*, *Notolopha cristata*, *Mycetophila alea*, **M. luctuosa**, *M. spectabilis*

Russula (R. aeruginea, R. albonigra, R. **alutacea**, R. amoenicolor, R. **atropurpurea** (= R. krombholzii), R. aurea (= R. aurata), R. aurora (= R. rosea), R. **azurea**, R. **chloroides**, R. **claroflava** (= R. flava), R. **cyanoantha**, R. decolorans, R. densifolia, R. **emetica**, R. **fellea**, R. foetens, R. **fragilis**, R. furcata, R. **grisea**, R. hydrophila (= R. griseascens), R. **ionochlora**, R. luteotacta, R. nauseosa, R. **nitida**, R. **nobilis**, R. **ochroleuca**, R. **olivacea**, R. paludosa, R. **parazurea**, R. **pectinata**, R. puellaris, R. **risigallina** (= R. lutea), R. sanguinaria (= R. rosacea), R. **sanguinea**, R. sardonica, R. **solaris**, R. **subfoetens**, R. torulosa, R. **velenovskiyi**, R. **vesca**, R. vinosa, R. violeipes, R. virescens, R. xerampelina)

Allodia [**A. lugens**, **A. ornaticollis**, **A. zaitzevi**], *Brachycampta*, *Allodiopsis rustica*, *Anatella minuta* (?), *Cordyla* (most species: **C. brevicornis**, **C. crassicornis**, **C. fasciata**, **C. flaviceps**, **C. fusca**, **C. nitidula**), *Exechia* (many species: **E. dorsalis**, **E. fusca**, **E. seriata**), *Exechiopsis* (s.s.) *indecisa*, **Rymosia affinis**, *Synplasta gracilis*, *Tarnania*, *Mycetophila blanda*, **M. britannica**, *M. evanida*, *M. hetschkoi*, **M. fungorum**, *M. ichneumonea*, **M. luctuosa**, **M. marginata**, **M. perpallida**, *M. ruficollis*, *M. spectabilis*, *M. strigatoides*

Russula section Compactae (R. adusta [? = nigricans], R. **nigricans**, R. delica)

Allodia [**A. ornaticollis**, **A. zaitzevi**], *Cordyla* [**C. fasciata**, **C. fusca**], *Exechia contaminata*, *Mycetophila alea*, *M. blanda*, **M. britannica**, *M. ruficollis*, **M. signata**, **M. signatoides**

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STEREACEAEStereum (*S. hirsutum*, *S. rugosum*, *S. sanguinolentum*)*Mycetophila marginata*, *M. ocellus*, *M. ornata*, *M. trinotata*,
Trichonta falcata, *T. foeda*, *T. melanura* (?)**SEBACINALES****SEBACINACEAE**Sebacina **incructans** *Mycetophila luctuosa***THELEPHORALES****BANKERACEAE**Sarcodon imbricatus *Rymosia setiger***THELEPHORACEAE**

Phellodon fuligineoalbus (ex Bankera)

*Mycetophila hetschkoi*Thelephora palmata *Mycetophila sordida***TRECHISPORALES****HYDNODONTACEAE**Trechispora hymenocystis *Mycetophila formosa***TREMELLALES****TREMELLACEAE**

Phaeotremella foliacea (ex Tremella)

*Phronia siebeckii***DACRYMYCETES – INCERTAE SEDIS****DACRYMYCETALES****DACRYMYCETACEAE**Calocera **cornea** *Trichonta apicalis*Calocera **viscosa** *Phronia siebeckii*, *Trichonta icenica***Phylum ASCOMYCOTA****PEZIZOMYCETES – PEZIZOMYCETIDAE****PEZIZALES****DISCINACEAE**Discina (*D. caroliniana*, *D.* (ex *Neogyromitra*) *fastigiata*)*Brachycampta silvatica*Gyromitra (*G. ancilis* (= *Discina perlata*), *G. esculenta*, *G. infula* (ex *Helvella*))*Allodia ornatocollis*, *Brachycampta barbata*, *B. neglecta*, *B. silvatica*,
Exechia lucidula, *E. neorepanda*, *E. separata*, *E. spinuligera*,
Synplasta gracilis

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MORCHELLACEAE*Morchella esculenta* (= *M. conica*)*Allodia ornaticollis*, *Rymosia fasciata**Verpa bohemica* (ex *Ptychoverpa*)*Allodia anglofennica*, *Brachycampta barbata*, *B. neglecta*, *B. silvatica*,
*Exechia parva***PEZIZACEAE***Legaliana badia* (ex *Peziza*)*Brachycampta barbata*, *B. foliifera*, *B. silvatica**Paragalactinia succosa* (ex *Peziza*)*Brachycampta silvatica**Peziza* (*P. micropus*, *P. repanda*, *P. varia* (ex *Aleuria*), *P. vesiculosa*)*Allodia anglofennica*, *A. lugens*, *A. ornaticollis*, *Brachycampta alternans*, *B. barbata*, *B. foliifera*, *B. pistillata*, *B. silvatica*,
*Mycetophila fungorum***PYRONEMATACEAE***Aleuria aurantia**Brachycampta silvatica***TUBERACEAE***Choiromyces venosus**Mycetophila alea*? *Tuber* **sp.***Stigmatomeria crassicornis***LEOTIOMYCETES – LEOTIOMYCETIDAE****HELOTIALES****GELATINODISCACEAE***Ascocoryne sarcoides**Anatella lenis*, *Stigmatomeria crassicornis***TRICLADIACEAE***Cudoniella acicularis* (ex *Helotium*)*Anatella flavomaculata***SCLEROTINIACEAE***Sclerencoelia fascicularis* (ex *Encoelia*)*Zygomyia vara***SORDARIOMYCETES – SORDARIOMYCETIDAE****HYPOCREALES****HYPOCREACEAE***Trichoderma viride* (= *Hypocrea rufa*)*Mycetophila ocellus**Trichoderma alutaceum* (ex *Podostroma*)*Rymosia placida*

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SORDARIOMYCETES –XYLARIOMYCETIDAE**XYLARIALES****XYLARIACEAE**Hypoxylon ? sp. *Trichonta vitta*Kretzschmaria **deusta** (= Hypoxylon deustum)*Mycetophila luctuosa*, *M. ocellus*Xylaria **hypoxylon** *Mycetophila marginata***Phylum AMOEBOZOA [= Myxomycetes]****MYXOGASTREA****LICEIDA****TUBIFERACEAE**Lycogala **epidendrum** *Mycetophila adumbrata*, *Platurocypta punctum*, *P. testata*Reticularia (= Enteridium) **lycoperdon***Platurocypta punctum*, *P. testata*Tubifera **ferruginosa** (= Tubulifera arachnoidea)*Platurocypta punctum*, *P. testata***PHYSARIDA****PHYSARACEAE**Fuligo septica *Platurocypta testata***TRICHIIDA****ARCYRIACEAE**Arcyria (A. **denudata**, A. **incarnata**)*Mycetophila vittipes*

Morphology of adult fungus gnats

Hutson *et al.* (1980) discussed the conflicting opinions regarding terminology of thoracic sclerites, wing veins and genitalia. They retained some of the terms used by Edwards (1925) but adopted others from the review of morphology by Vockeroth (1981), then in press as part of the Nearctic Manual, which set out to standardise terminology throughout the Diptera. Søli (1997) and Søli *et al.* (2000) also accepted much of the terminology used by Vockeroth, but differed in interpretation of some structures, e.g. the vein termed R_{2+3} by Vockeroth was considered by them to be R_4 . The view that R_{2+3} is lost in the ground plan of Sciaroidea has until recently been accepted by the author, but it has now been concluded (Søli 2017) that this vein is correctly interpreted as R_{2+3} ; it is absent in subfamily Mycetophilinae. Another significant change in Søli (2017) is the conclusion that the posterior (cubital) fork partly comprises a branch (M_4) of the median vein. Søli *et al.* (2000) and Søli (2017) are broadly followed in the terminology used here and explained below. Where the terms used differ from Hutson *et al.*, the equivalent term used by them is stated.

The account here relates generally to fungus gnats, but particular attention is given to the characteristics of the subfamily Mycetophilinae. The terms used here for structures are given in bold italics, and this account also serves as a glossary of the terminology used in the keys. All characters used in the keys are illustrated here in the figures.

Head (Figures 14 & 15)

This is more or less rounded, with the posterior surface convex to flattened, and closely adpressed to the thorax, where it is inserted below the level of the strongly arched front of the thorax.

The top of the head or **vertex** (**vrt** in Fig. 14) is usually bristly. Situated in front of this are the **ocelli** (singular **ocellus**), which are simple eye facets; there are usually three, but sometimes the median ocellus (**m oc** in Fig. 14) is reduced or absent. The lateral ocelli (**l oc** in Fig. 14) vary in position, but in Mycetophilinae they are always close to the compound eye margins.

The **compound eyes** (**comp eye** in Fig. 14) are usually reniform, due to having a concave inner margin adjacent to the base of each antenna, and are widely separated dorsally in most fungus gnats, including Mycetophilidae, a distinction from Sciaridae where they are in contact dorsally, forming an “eye-bridge”. The eyes bear dense short setulae (also visible in Fig. 14) between the individual facets (**ommatidia**).

Between the upper eye margins is the **frons** which is more or less bristly; a central furrow (**fr fur** in Fig. 14) may be present, extending from the median ocellus to an anterior frontal tubercle (**fr tub** in Fig. 14).

Below the insertion of the antennae is the **face** (**fc** in Fig. 14), which may bear bristles. Below the face is the **clypeus** (**clyp** in Figs 14 and 16), which is a variously shaped bristly lobe. The clypeus is sometimes elongate (e.g. *Gnoriste* in Gnoristinae, some Keroplatidae) but in Mycetophilinae it is short-ovate to rounded, but shorter than broad in some genera.

The *mouthparts* comprise a central *labrum* and a pair of fleshy *labella* (singular *labellum*, *lbl* in Fig. 14) lateral to it, and are shorter than the head in Mycetophilinae. The mouthparts are more elongate in a few Mycetophilidae (*Gnoriste* species), and in some Keroplatidae (and also in Lygistorrhinidae – which are absent in Europe and are treated as a subfamily of Keroplatidae by Mantič *et al.* 2020).

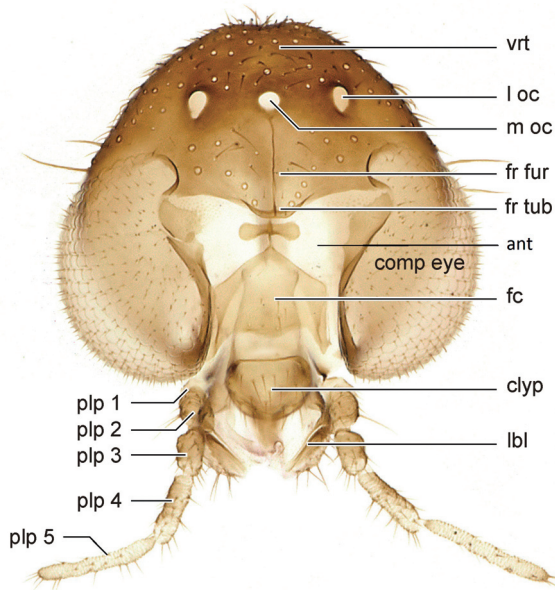


Figure 14. Head of *Sciophila* sp., frontal view without antennae (from Søli 2017, fig. 11): ant = insertion of antenna; clyp = clypeus; comp eye = compound eye; fc = face; fr fur = frontal furrow; fr tub = frontal tubercle; l oc = lateral ocellus; lbl = labellum; m oc = median ocellus; plp = palpomere (palpal segment); vrt = vertex.

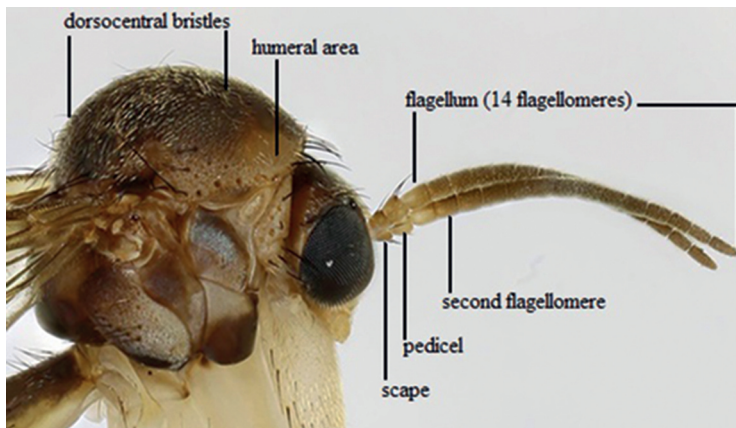


Figure 15. *Allodiopsis rustica* head and thorax, to show antennal structure.

Lateral to the mouthparts are the maxillary *palpi* (singular *palpus*), which may be as long as or longer than the head. Each palpus comprises five segments (*palpomeres*) (*plp* in Fig. 14) in the Mycetophilinae (there are a reduced number in some Keroplatidae), of which the first two are very short and usually not discernible in dry specimens. In *Cordyla* the third (antepenultimate) palpomere is enlarged, especially in the males of most species, and evidently includes a sensory structure; a corresponding sensory pit is present on the third palpomere in some other genera.

The *antennae* (singular *antenna*; Fig. 15) are usually inserted near the middle of the head, sometimes (in Manotinae) higher. They vary greatly in length and may be as long as or

longer than the body in Bolitophilidae and some Keroplatidae, but in Mycetophilinae they are at most a little longer than the head and thorax together. Each antenna comprises two basal segments (*scape* and *pedicel*) and a multi-segmented *flagellum*, usually with 14 *flagellomeres* (a reduced number in *Cordyla*, varying between species and the sexes from 9–13). The flagellum is usually more or less cylindrical and tapered apically in Mycetophilidae; it is sometimes flattened or otherwise modified in other families. The scape and pedicel may bear short bristles and the flagellum is clothed with fine setulae.

Thorax (Figures 15 & 16)

This is usually robust and more or less arched dorsally, giving a humped appearance in lateral view but varying considerably in the form and relative sizes of the pleural sclerites (the parts of the pleura or sides of the thorax), especially between the tribes Exechiini and Mycetophilini, of which examples are figured for comparison in the key to genera of subfamily Mycetophilinae.

The thorax consists of three body segments, the prothorax (nearest the head), mesothorax and metathorax, each of which bears a pair of legs. The wings are attached to the mesothorax and the halteres to the metathorax. Most of the structure of the thorax is mesothoracic in origin with the parts of the other segments relatively reduced. Figures 15 and 16 show the parts that provide characters used in the keys.

At the front of the thorax is the *pronotum*, the dorsal part of the prothorax which forms a collar-like structure behind the head; it is visible laterally as a pronotal lobe formed by the partial fusion of the *anteppronotum* (*aprn* in Fig. 16) and *postpronotum*. Ventrally more or less separated from the pronotum is the *proepisternum* (*prepst* in Fig. 16), which forms a lobe above the front coxa. The pronotum and proepisternum usually bear bristles. The number and arrangement of bristles on the proepisternum may be taxonomically important in some genera. The *anterior* (prothoracic) *spiracle* (a *spr* in Fig. 16) is situated on a weakly sclerotised area between the anteppronotum and *anepisternum* (*anepst* in Fig. 16); it bears fine setulae (stronger bristles may be present adjacent to the spiracle in some Keroplatidae).

The dorsal surface of the thorax is the *mesonotum* (*msm* in Fig. 16), which is broad and arched dorsally, and extended anteriorly in some Mycetophilinae (e.g. *Epicypta*, *Sceptonia*). The mesonotum may be uniformly coloured or may have three darker stripes on a paler ground, where the middle stripe reaches closer to the front margin (or the stripes may be fused) to leave a lighter area above the anterior spiracle. This is here termed the *humeral area* (indicated in Fig. 15); this and the side margin may thus be sometimes differently coloured to the rest of the mesonotum (as in Fig. 15). The surface of the mesonotum may be densely covered with short fine setulae; often there are stronger and longer bristles present, which may be arranged irregularly, especially near the side margins (as in Fig. 15). Regular *dorsocentral* rows may be present near the mid line (indicated in Fig. 15; these bristles are thick and blunt in *Notolopha cristata*, which is recognisable from this character alone); a median *acrostichal* row of bristles may also be developed (e.g. in *Exechia* and *Exechiopsis* subgenus *Xenexechia*).

Posterior to the mesonotum is the **scutellum** (**sctl** in Fig. 16), which is short and apically rounded. It often bears short bristles and in Mycetophilinae there are one or more pairs of long strong, usually convergent, apical marginal bristles. The number and relative lengths of the marginal bristles may differ between species and genera, and are sometimes useful as a key character.

Below the scutellum is the **mediotergite** (= postnotum of Hutson *et al.*) (**mtg** in Fig. 16), which forms the posterior surface of the thorax above the base of the abdomen, from which it is separated by a narrow metanotum; the mediotergite is bristled in some fungus gnats but bare in Mycetophilinae (except sometimes for decumbent setulae present in *Rymosia*).

The side of the thorax centrally comprises the sclerites of the mesopleuron. The larger anterior part is the **mesepisternum** and the narrower posterior part is the **mesepimeron**. The mesepisternum is situated behind the prothorax and the basal part of the fore coxa, and above the mid coxa, with which it articulates; it comprises an upper **anepisternum** (**anepst** in Fig. 16), which is separated by a suture from the lower **katepisternum** (as in Hutson *et al.*; = *preepisternum* 2 of Söli *et al.* 2000) (**kepst** in Fig. 16). Presence or absence of bristles on the anepisternum is an important key character. The katepisternum is usually bare; its form differs between the two tribes of Mycetophilinae (Exechiini and Mycetophilini) and between some genera.

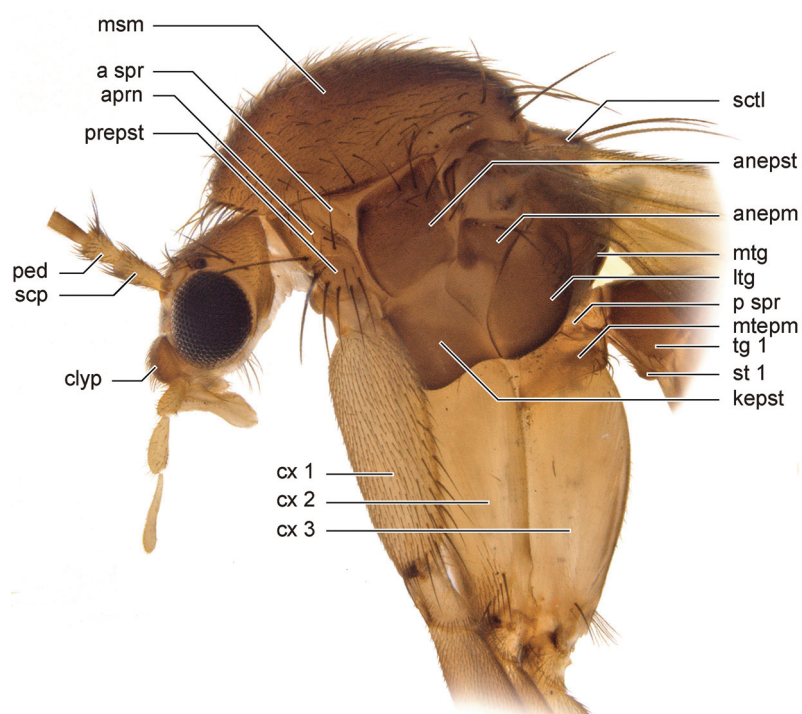


Figure 16. Head and thorax of *Mycetophila* sp., with base of antenna, lateral view (from Söli 2017, Fig. 12): a spr = anterior spiracle; anepm = anepimeron; anepst = anepisternum; aprn = antepronotum; clyp = clypeus; cx = coxa; kepst = katepisternum; ltg = laterotergite; msm = mesonotum; mtepm = metepisternum; mtg = mediotergite; p spr = posterior spiracle; ped = pedicel; prepst = proepisternum; scp = scape; sctl = scutellum; st = sternite; tg = tergite.

The **mesepimeron** (= pteropleuron of Hutson *et al.*) is situated below the wing base and is usually broad above and more or less strongly narrowed below, reaching close to the hind margin of the mid coxa. The broader upper part is the **anepimeron** (**anepm** in Fig. 16), which may bear bristles.

Behind the mesepimeron and contiguous dorsally with the mediotergite is the **laterotergite** (= pleurotergite of Hutson *et al.*) (**ltg** in Fig. 16), which is ovate, usually convex and sometimes keeled medially. It often bears bristles, which are scattered irregularly.

The **metanotum** is a narrow bare strip posterior to the mediotergite, laterally connected to the metapleuron by a membranous area behind the haltere. The **metapleuron** is situated behind the base of the mid coxa and between the laterotergite and the hind coxa; it comprises an anterior broad rectangular **metepisternum** (= hypopleuron of Hutson *et al.*) (**mtepm** in Fig. 16), which is separated by a suture from a narrow posterior **metepimeron**. The metepisternum often bears bristles. The **posterior spiracle** (**p spr** in Fig. 16) is situated between the laterotergite and metepisternum, and in front of the haltere.

Wings (Figures 17–20)

The wings are long, broad medially and rounded apically, usually with a rounded anal lobe, tapered basally, with a narrow strip-like alula behind and are inserted in the thorax medially above the anepimeron (**anepm** in Fig. 16).

The **wing membrane** is either clear or more or less yellowish or brownish. It is generally unmarked but some species bear a pattern of darker, usually more or less brown, markings. Such markings are most often apical or preapical and/or medial, the latter usually including crossvein r-m, and are frequently of a specific nature, although some variation may occur within species. The membrane bears fine setulae (**microtrichia**, which are an outgrowth of the cuticle), usually more or less covering the entire surface and arranged either randomly or in distinct rows, that arrangement sometimes more evident on the apical part of the wing. **Macrotrichia** (a term applied to articulated setulae with a socket) are present on the membrane in some genera of most families of fungus gnats (examples in Figs 17 and 18), including some Mycetophilidae, but they are absent in Mycetophilinae, except on some wing veins and on the anal lobe of some *Trichonta* species.

The **wing venation** is distinctive for each of the families of fungus gnats (e.g. the Keroplatidae are recognised by the radio-medial fusion, Fig. 17) and often also at the generic level, so is a valuable means of recognising genera and higher taxa. Wing veins often bear macrotrichia (referred to in the keys as setulae); these are always present on the radial veins, and their presence or absence on other veins is diagnostic for some genera (as in Exechiini) or at a specific level (e.g. in *Trichonta*). The wing veins are referred to in the text and keys by the abbreviations shown on the figures here.

The fore margin of the wing is supported by a vein, the **costa** (**C**), which is clothed with short bristles. The costa extends from the wing base at least to the tip of vein R₄₊₅ or it

sometimes extends to a point between the tips of R_{4+5} and M_1 . The wing margin beyond the tip of the costa bears fine short setulae, which may be a little longer on the anal lobe and alula.

A **humeral crossvein** (h), linking the base of the subcosta with the costa, is always present.

A relatively weak vein immediately behind the basal part of the costa is the **subcosta** (Sc), which extends from the wing base to at most the middle of the wing, but is usually shorter. It either ends in the costa (as in Figs 17 and 18), when there may be a short vertical crossvein (sc-r) linking it to the succeeding vein R_1 (as in Fig. 18), or Sc is more or less abbreviated, and sometimes ending in R_1 (as in Fig. 19); in Mycetophilinae it always either ends free (as in Fig. 20) or in the basal part of R before it branches into R_1 and Rs.

The remaining veins are defined as belonging to the radial, median, cubital and anal sectors, and the abbreviations used for them (as indicated in the figures here) reflect these categories.

The **radius** (R) is a strong vein basally, and branches before or near the middle of wing. The anterior branch (R_1) usually appears as a continuation of R and ends in the costa beyond the middle of the wing; in the Mycetophilinae it reaches the costa at or beyond the apical third of the wing (as in Figs 18–20).

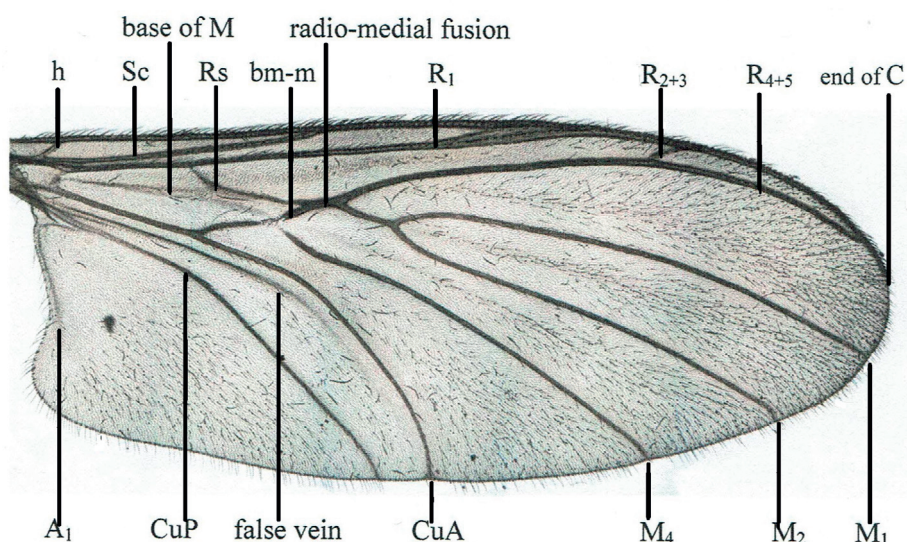


Figure 17. Wing of *Macrocera stigmoides* (Keroplastidae).

The **anterior crossvein** (r-m) links the radius with the median sector. It is usually short and extends more or less diagonally towards the wing base from its junction with Rs, thus forming an angle with it. This crossvein is obliterated by a radio-medial fusion in most Keroplastidae (as in Fig. 17) and it extends basally in line with R_{4+5} and parallel with R in the family Sciaridae and in the mycetophilid genus *Azana* (Sciophilinae).

The posterior branch of the radius is termed **Rs** (= **radial sector**). Primitively in Diptera this has four branches (R_2 to R_5) but in Sciaroidea, including fungus gnats, there are never more than two. The anterior of these branches R_{2+3} is unbranched or absent, and the posterior branch R_{4+5} is always present and unbranched. The basal part of Rs is more or less diagonal before its junction with a crossvein (r-m) and then the part beyond this crossvein extends more or less parallel with R_1 to end in the costa at or near the wing tip. In the subfamily Mycetophilinae, where R_{2+3} is always absent, this vein (identified as R_{4+5}) is always unbranched and always ends shortly before the actual tip of the wing. Where, in some other fungus gnats, R_{2+3} is present, the branching of Rs may be before (Figs 18 and 19) or beyond (Fig. 17) its middle and R_{2+3} may end in the costa (Fig. 17) or in R_1 . In those members of the family Mycetophilidae in which R_{2+3} is present, it always ends in R_1 , thus forming a more or less rectangular **radial cell** (as in Figs 18 and 19). Areas of the wing membrane behind veins may be referred to as cells and named after the preceding vein in lower case; here in the keys to *Mycetophila* and *Zygomyia* reference is made to cells r_1 (the area between R_1 and R_{4+5}) and r_5 (the area between R_{4+5} and M_1) in relation to the extent of wing markings.

The basal part of the **median vein (M)**, before its junction with crossvein r-m, is primitively weak in Sciaroidea. It is distinguishable in Ditomiyidae, Diadocidiidae, Bolitophilidae and some Keroplatidae (as in Fig. 17), but it is entirely lost in Sciaridae and Mycetophilidae. In the latter it is replaced functionally by the posterior crossvein **bm-m**, which extends back as a longitudinal vein (as in Figs 18–20), reaching close to the wing base, appearing as a basal extension of M_{1+2} , and it has often been interpreted as the base of M.

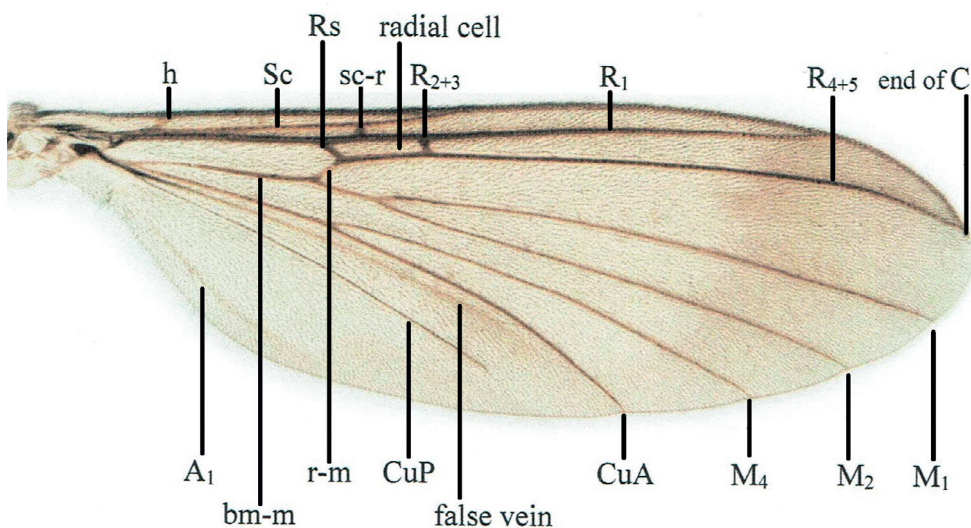


Figure 18. Wing of *Eudicrana nigriceps* (Mycetophilidae).

Beyond its junction with r-m, the median vein comprises a single vein basally, the **median stem** (M_{1+2}), which is usually branched before or near the middle of the wing as a **median fork**; the branches (M_1 and M_2) meet the wing margin behind the wing tip. Sometimes M_{1+2} is unforked (M_1 is absent) or one or other of the branches of the median fork are incomplete basally or apically. In some Mycetophilidae the median stem is fairly long (as

in Fig. 19) but in the subfamily Mycetophilinae it is always short (as in Fig. 20) and the base of the median fork is before the middle of the wing; M_1 and M_2 are usually complete but sometimes (some *Cordyla* species, *Brevicornu serenum*) one or both of these veins are abbreviated apically. Vein M_3 is apparently lost in Sciarioidea, but (Søli 2017) the anterior branch of the posterior fork is now identified as M_4 (as followed here; or as a fused vein M_4+CuA_1).

Primitively in Sciarioidea, a **posterior crossvein** (**bm-m**) links the branches of **M**. It is situated at the base of the median stem in Ditomyiidae and Diadocidiidae, or more basally in Bolitophilidae (see figures in Family Recognition section), or at the radio-medial fusion in Keroplatidae (as in Fig. 17). The portion of the anterior branch of the posterior fork preceding this junction can be interpreted as crossvein **m-Cu**. As indicated above, in Sciaridae and Mycetophilidae **bm-m** has migrated basally to meet M_4+CuA near the base of the wing, so is functionally part of a long vein rather than a crossvein.

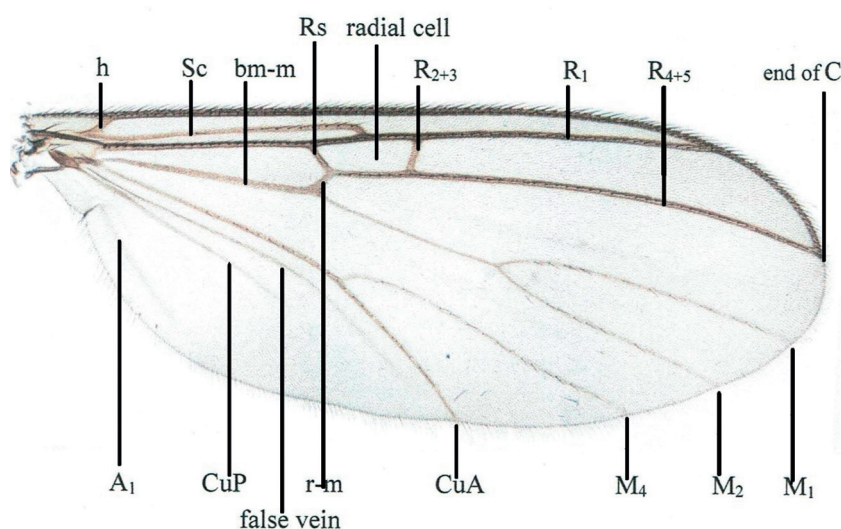


Figure 19. Wing of *Mycomya annulata* (Mycetophilidae).

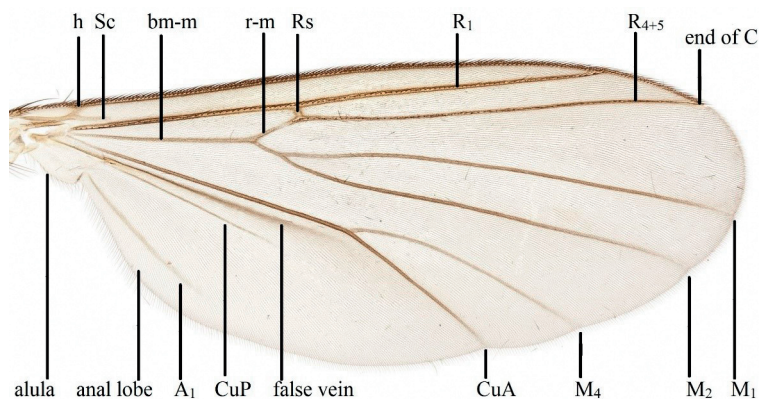


Figure 20. Wing of *Pseudexechia aurivernica* (Mycetophilidae).

The *cubitus* (Cu) branches near the wing base, and comprises a strong anterior branch (CuA) and a variable posterior branch CuP. Vein CuA is usually forked, forming the *posterior fork*, but as explained above the anterior branch of this fork is now interpreted as M₄. The branches of the posterior fork diverge and end in the hind margin of the wing. Sometimes CuA is unforked (M₄ is absent), and this is the case in some genera of the subfamily Mycetophilinae (*Sceptonia*, *Zygomyia*). In one species (*Zygomyia semifusca*) M₄ is short and weak. A fold-like *false vein*, which runs parallel with and close to CuA and ends free, has till recently been interpreted as CuP. The vein formerly regarded as A₁ is now identified as CuP; this vein may almost or quite reach the wing margin (Ditomyiidae, Diadocidiidae, Bolitophilidae and many Keroplatidae) but it is often abbreviated; it ends well before the wing margin in most Mycetophilidae, including Mycetophilinae (except in *Platurocypta* and *Epicypta* where it almost or quite reaches the wing margin).

The *anal vein* (A₁) is now interpreted as the weak vein often apparent on the anal lobe and also ending well before the wing margin.

The *halter* (or halter, plural *halteres*) is the modified hind wing, which is simple in structure with a more or less cylindrical stem and apical knob-like swelling and is regarded as a balancing organ. It is inserted in the side of the thorax behind and diagonally below the wing, behind the laterotergite and above the metepisternum.

Legs (Figure 21)

The legs are long, with tibial spurs usually well developed and often more or less strong bristling on the tibiae. Each leg comprises a coxa articulating with the thorax, a short trochanter, a femur (plural femora), a tibia (plural tibiae), and a tarsus (plural tarsi) composed of five segments (tarsomeres).

The *coxae* (cx in Fig. 16) are long and strongly developed in most Sciaroidea. They are normally simple in structure but some Mycomyinae have modifications of the fore or mid coxa in the male. The bristling of the hind coxa is of taxonomic importance in some Mycetophilinae.

The *femora* are usually slender, sometimes swollen or laterally compressed, weakly bristled. Sometimes stronger ventral bristling may be present on the mid femur (e.g. in *Anatella*).

The *tibiae* are usually slender. The fore tibia has a preapical brush of fine setulae on the anterior surface and a single apical *tibial spur*. The mid and hind tibiae usually bear a pair of ventrally directed spurs apically, of which the anterior is usually a little shorter; sometimes (in some *Anatella* species) the mid tibia may have the anterior spur reduced or absent (some Keroplatidae have spurs reduced or a single spur on all tibiae). The spurs are clothed with very fine short setulae. The mid tibia of some Sciophilinae and Gnoristinae has a *sensory pit*, sometimes associated with a swelling, situated dorsally on the basal half, but this is always absent in Mycetophilinae. The hind tibia sometimes has an apical comb of bristles posteriorly, and in some genera there is a dorsal cleft apically.

The tibiae often bear some longer bristles, with specific variation in size and arrangement; the bristles are either irregular or in regular rows, and may be strongly developed in some genera of Mycetophilinae (e.g. *Mycetophila*, *Dynatosoma*), where their arrangement is often of taxonomic importance, as is the coloration of the rows of fine setulae that run the length of the tibia in front of the anterior bristles. The tibial setulae are in more or less regular rows in Mycetophilinae and Mycomyinae, but irregular in other Mycetophilidae.

The *tarsi* are usually simple in structure; the first of the five tarsomeres is usually the longest; the intermediate tarsomeres may be more or less enlarged ventrally in the females of some species, and especially in *Mycetophila*, where there are a few species with this swelling in both sexes. The apical segment bears *tarsal claws*, which are simple or may bear teeth or a basal comb ventrally. Pulvilli (a pair of pads below the claws that are present in some Diptera) are absent in fungus gnats, but a central pad (the *empodium*) is sometimes present.

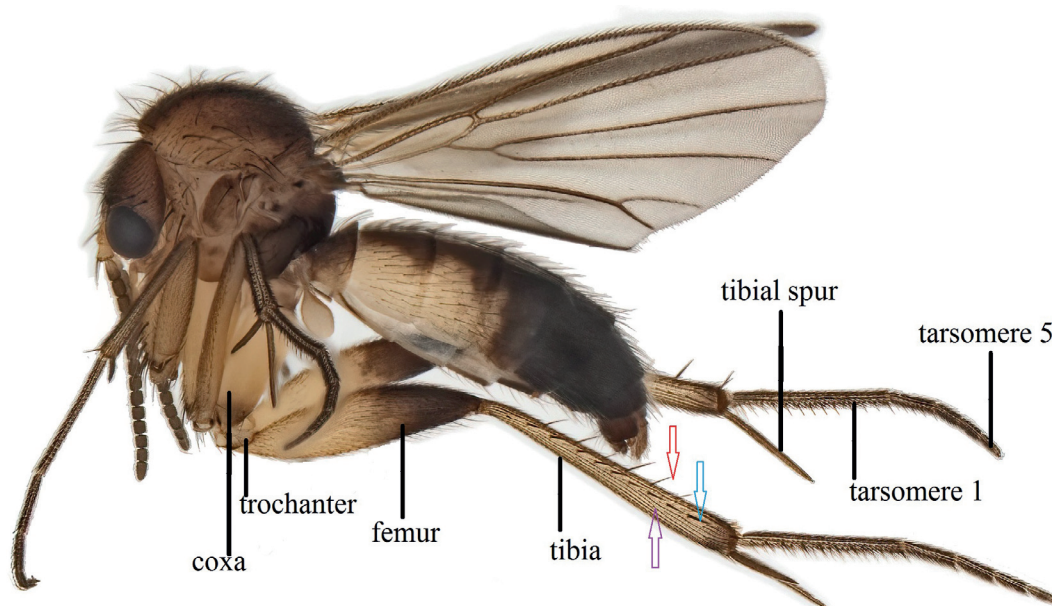


Figure 21. *Macrobrachius kowarzii* to show parts of hind leg. Arrows indicate bristling of hind tibia: red dorsal bristles, blue anterior bristles, purple rows of anterior setulae.

Abdomen

This is usually elongate, narrow at the base and broadened medially (broader near the tip in some Keroplatidae), more or less cylindrical, and sometimes depressed dorsoventrally or compressed laterally. The pregenital segments are each composed of two sclerites, a dorsal *tergite* and ventral *sternite*; the tergite is usually larger and enclosing the sides of the abdomen. Contrasted markings involving paler bands or spots may be present on the tergites; whether these are situated basally or apically is often of taxonomic importance. Spiracles are present in the membrane below the margins of

tergites 1-7 (counting back from the base of the abdomen). The sternites in Mycetophilidae often have a pair of weakly sclerotised fold lines, which may be close to the mid line or to the lateral margin; sometimes also a median fold line is present. In the male the sclerites of segments 7 and 8 are often shorter or reduced, and they are sometimes more or less contracted or telescoped into segment 6, while the sclerites of segment 9 are often modified and form an integral part of the genitalia. In the female there are seven unmodified pregenital segments.

Male genitalia (Figure 22)

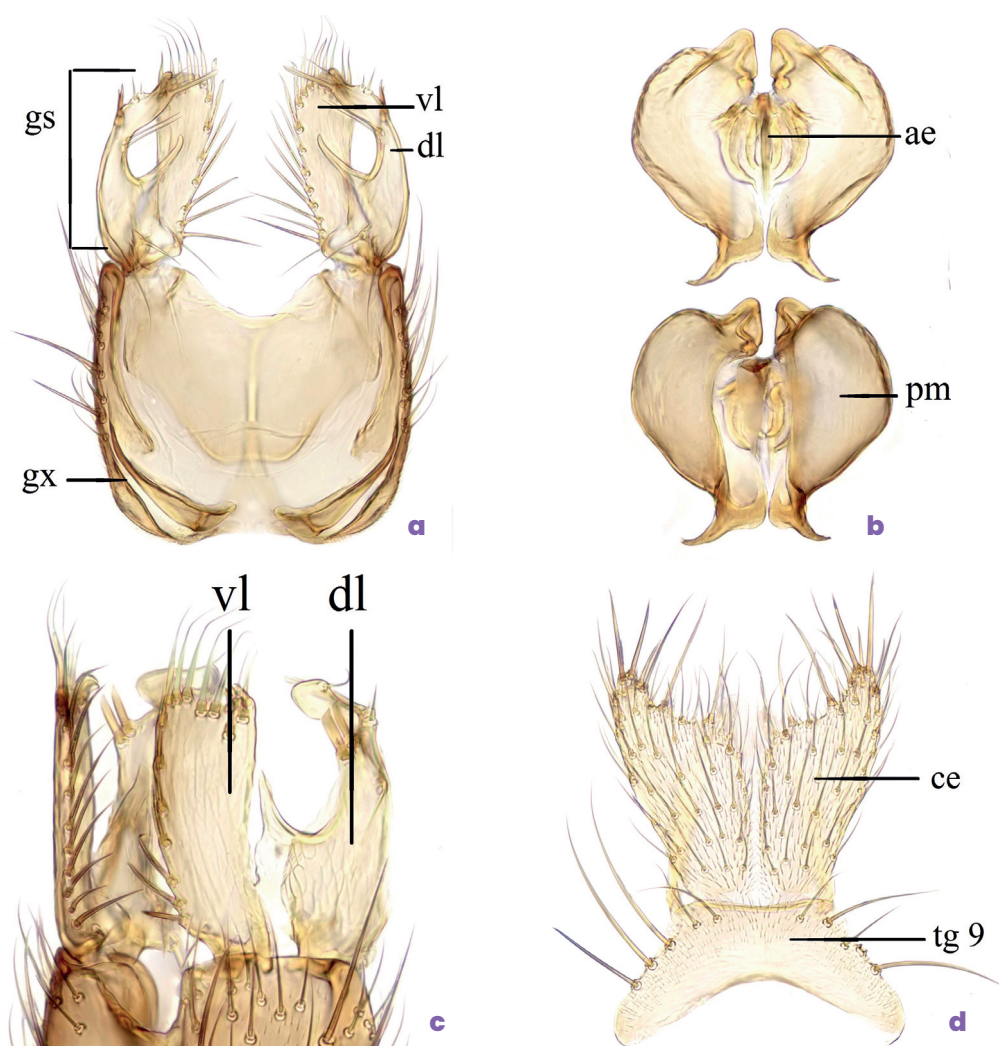


Figure 22. Male genitalia of *Mycetophila adumbrata*: (a) dorsal view of gonocoxites (gx) and gonostyli (gs) after removal of tergite 9, proctiger, parameres and aedeagus; (b) aedeagus (ae) and parameres (pm), dorsal (above) and ventral views; (c) lateral view of gonostyli, showing discrete ventral (vl) and dorsal (dl) lobes (stylomeres); (d) tergite 9 (tg 9) and proctiger bearing cerci (ce).

These are very variable in form but are of the same basic structure throughout the Sciaroidea. They are highly specific in most structural details and are valuable for identification at both the generic and specific level. The genitalia are usually clearly visible externally, although where they are small and segments 7 and 8 are reduced they may be partly or entirely contracted into segment 6 (e.g. *Sceptonia*). **Sternite 8** is sometimes distinctive in form or bristling (e.g. in some *Brevicornu* species).

Tergite 9 (Fig. 22d) is variously modified and may partly or entirely cover the genitalia dorsally; it is sometimes partly fused with the gonocoxites basally, but is always separate although usually rather short or small in the subfamily Mycetophilinae. **Sternite 9** may be either distinct or fused with the gonocoxites. Tergite 9 apically partly or entirely covers the proctiger and a reduced segment 10 is sometimes present between these structures.

The **proctiger** comprises a ventral sclerite (**hypoproct**) and on each side an unsegmented **cercus** (plural **cerci**) (Fig. 22d). The hypoproct is sometimes divided medially or is more or less fused with the cerci. Each cercus is usually a simple lobe bearing fine bristles; in some genera of Gnoristinae (*Boletina*, *Creaghubhia*) thickened spinose bristles are present.

The **gonocoxites** (Fig. 22a) are a pair of lobes forming most of the ventral surface of the genitalia; the lobes are sometimes separate but in Mycetophilinae their bases are partly or entirely fused medially, probably due to fusion with sternite 9. Where their ventral surfaces have a medial excavation, there may be a median process with a highly specific structure that is important for identification, here termed the **hypandrial lobe** (the ventral appendage of the gonocoxites in Zaitzev 2003); it is present in most Exechiini and in some *Mycetophila* species.

The **gonostylus** (plural **gonostyli**) (Fig. 22a, c) is a paired clasper-like structure, which articulates with each lateral lobe of the gonocoxites distally. It varies widely in form and its structure is of specific importance. In Sciaroidea it is sometimes simple or with apical teeth (e.g. in some Keroplatidae), but in Mycetophilidae one or more lobes or processes may have a more complex structure.

In Mycetophilinae the gonostylus is divided into two or more articulating lobes. Here such lobes are referred to by their position (e.g. dorsal, ventral, medial). The simplest structure is that shown in Fig. 22, where there are two discrete (dorsal and ventral) lobes or stylomeres. This is found in many Mycetophilini, including the genera *Mycetophila*, *Platurocypta*, *Sceptonia*, *Zygomyia* and *Macrobrachius*. In some other Mycetophilini (*Dynatosoma*, *Phronia* and *Trichonta*) and in most Exechiini there are additional lobes (or branches) between, internal or basal to the dorsal and ventral lobes. In *Epicrypta* the gonostylus is reduced and functionally replaced by large bristly lobes of the gonocoxites. The structure of the gonostylus is most complex in some Exechiini, and Kjærandsen (2006), dealing with the genus *Tarnania*, proposed a terminology for each component of the gonostylus (dorsointernal, medial, internal and anterior branches in addition to the externally conspicuous dorsal and ventral branches). In that case, and in many other Exechiini, the medial and other branches (or lobes) are internal or basal to the dorsal and ventral lobes, but in *Cordyla* a medial lobe is intermediate between the dorsal and

ventral lobes, and a similar arrangement is found in many *Trichonta* and *Phronia* species. In the keys, for the most part, characters visible in ventral and dorsal view are illustrated, with attention drawn to other features where of diagnostic importance, e.g. the medial lobe in *Brevicornu* species, and an awl-shaped process in some *Allodia* and *Allodiopsis* species.

Parameres (also termed *aedeagal guides*) (Fig. 22b) are internal structures of various form, which articulate with the gonocoxites by sclerotised *gonocoxal apodemes* and enclose the aedeagus between them. The *aedeagus* (Fig. 22) is variously formed; it is suspended between the parameres and sometimes with a sclerotised *ejaculatory apodeme* basally. The parameres and aedeagus are often fused into an *aedeagal complex* and cannot be easily discerned as separate structures.

Female genitalia (Figures 23 & 24)

The ovipositor is simpler in structure compared to the male genitalia. Although specific characters useful for identification are found in many genera, in other cases (e.g. *Allodia*, *Brevicornu*) clear specific differences are difficult to discern. In some Exechiini (e.g. *Exechia*, *Exechiopsis*) tergite 7 (Fig. 23) has a specific structure to its apical margin, which is useful for identification.

Tergite and sternite 8 form the basal part of the ovipositor. *Tergite 8* is usually unmodified, but is sometimes short or medially divided.

The *proctiger* which comprises a ventral sclerite (*hypoproct*), which is usually broadly rounded apically and with a *cercus* (plural *cerci*) on each side (Fig. 23), articulates with the last sclerotised tergite. The cerci are weakly sclerotised and usually clothed with fine bristles. They usually comprise two segments, but sometimes only one is present (e.g. *Rymosia*, and in some species of *Exechia*, *Pseudexechia* and *Mycetophila*, in which genera most species have two segments). The form of the cerci is often of specific importance.

Sternite 8 (Fig. 23) is variable in shape; it is often elongate and bears a pair of lobes (*gonocoxites 8*) apically, which sometimes bear strong bristles or spines, as in *Exechia seriata* shown here.

The *spermathecae* are enclosed within the abdomen and are more or less spherical structures connected to the spermathecal ducts. Two are present in Sciaroidea. These are primitively sclerotised as in Bolitophilidae and some members of other families but are membranous and not visible in macerated specimens of Mycetophilidae, Ditomyiidae and some Keroplidae.

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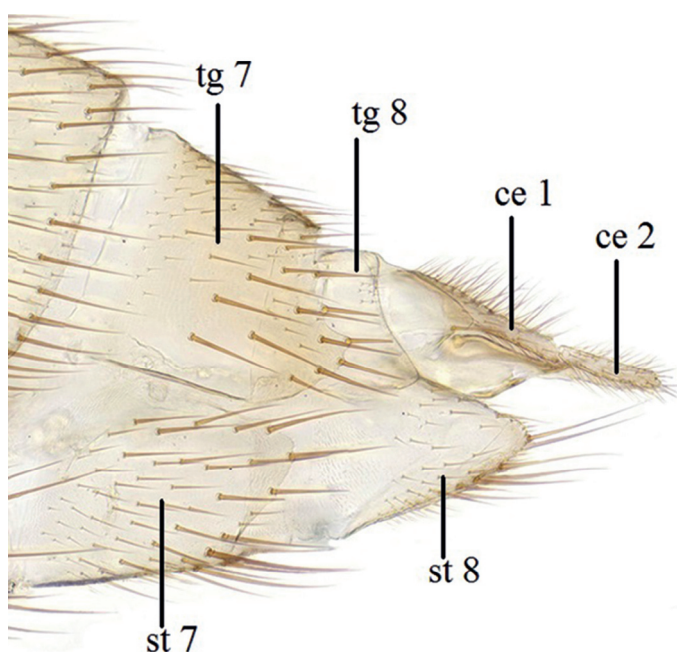


Figure 23. Female of *Synplasta excluda*, lateral view: ce 1 = basal segment of cercus; ce 2 = apical segment of cercus; tg 7, tg 8 = tergites 7 & 8; st 7, st 8 = sternites 7 & 8.

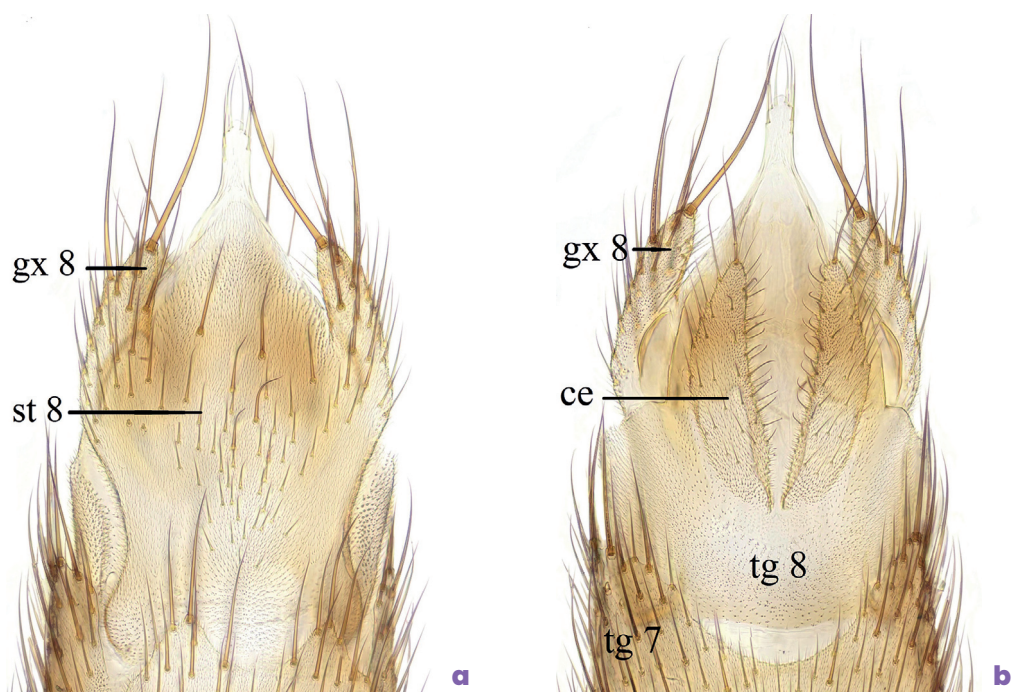


Figure 24. Female of *Exechia seriata*: (a), ventral view; (b), dorsal view, ce = cercus; gx 8 = gonocoxites 8; tg 7 = tergite 7; tg 8 = tergite 8; st 8 = sternite 8.

Recognition of the families of fungus gnats

The families Dityomyiidae, Keroplatidae, Diadocidiidae and Bolitophilidae correspond to subfamilies in Hutson *et al.* (1980). Two subfamilies (Keroplatinae and Macrocerinae) have since been recognised in Keroplatidae, corresponding to the tribes of Keroplatinae in Hutson *et al.* and to their original concepts as subfamilies by Edwards (1925); Mantič *et al.* (2020) also proposed separation of Platyurinae from Keroplatinae to include the genus *Platyura*. All the families can be readily distinguished by their wing venation.

The above four families differ from Mycetophilidae and Sciaridae in having a crossvein (bm-m) linking the stem of the median fork with the anterior branch (M_4) of the posterior fork (in some Bolitophilidae this crossvein is replaced by a fusion of the veins at the corresponding point). The course of vein M before the junction with this crossvein is at most weakly indicated.

In Mycetophilidae and Sciaridae bm-m is more or less horizontal and meeting the stem of the posterior fork close to the base of the wing, so the anterior branch of the fork is not linked to any other vein. The posterior fork branches close to the base of the wing in Sciaridae and in some genera of Mycetophilidae (e.g. *Ectrepesthoneura*), but in most Mycetophilidae it branches more distally from a longer stem.

Family DIADOCIDIIDAE

Crossveins r-m and bm-m are close together and form a nearly straight line across the wing near the basal third. Vein R_{2+3} is absent. Macrotrichia are present on the wing membrane. The antennae are slender and longer than the head and thorax together.

There is a single genus *Diadocidia* with three species in Britain.

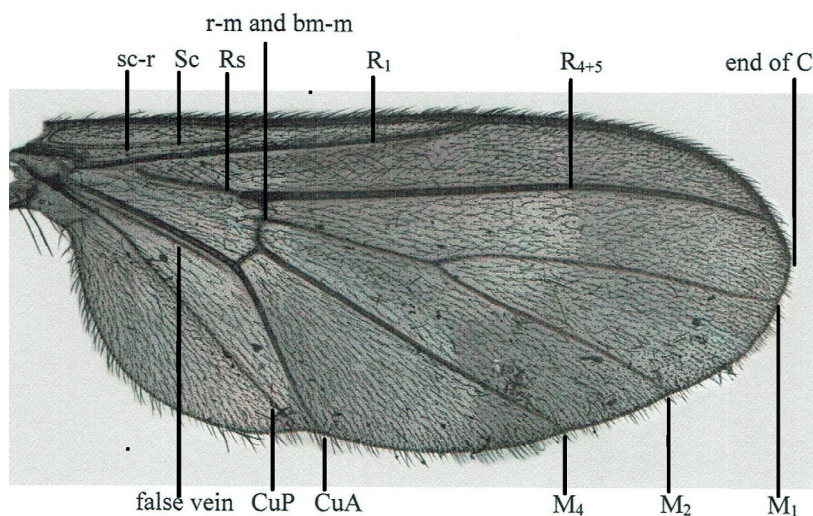


Figure 25. Wing of *Diadocidia ferruginosa*.

Family DITOMYIIDAE

Vein R_{2+3} is present and ends in the costa. It is half or more as long as R_{4+5} (as indicated in the figure of *Symmerus annulatus* wing). Where R_{2+3} is present in the other families it is shorter and is much less than half as long as R_{4+5} . Vein Sc is short and ends free and the wing membrane bears macrotrichia.

There are three species in two genera (*Ditomyia* and *Symmerus*) in Britain.

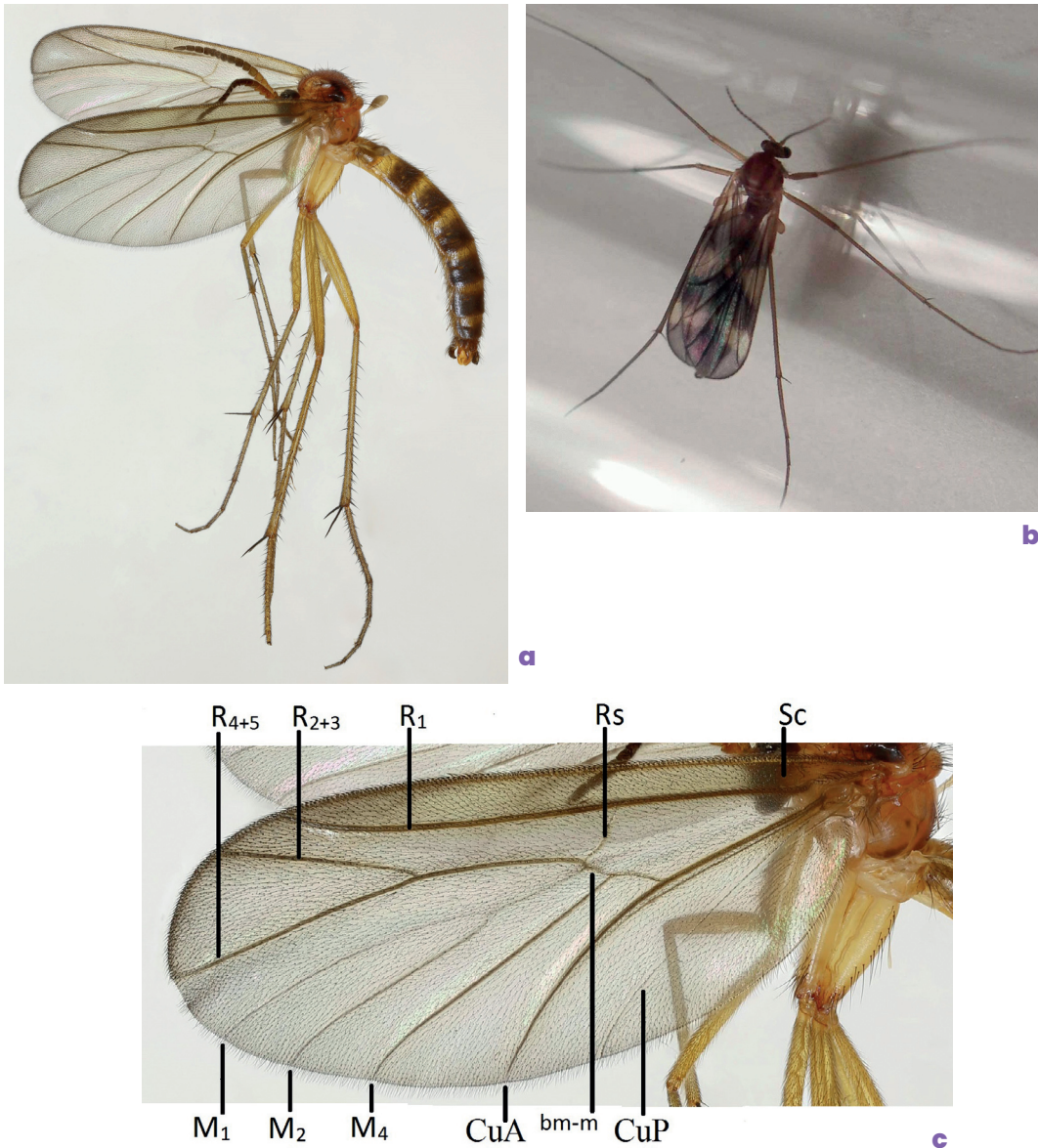


Figure 26. (a) *Symmerus annulatus*, (b) *Ditomyia fasciata*, (c) wing of *Symmerus annulatus*.

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Family BOLITOPHILIDAE

A distinct semicircular marking (the pterostigma) around the tip of R_1 is unique among fungus gnats. Crossvein $bm-m$ is well before $r-m$, and is sometimes absent when there is a short fusion with M_4 at this junction. Vein R_{2+3} is always present and relatively short. The wing membrane lacks macrotrichia. The antennae are slender and as long as or longer than the body in both sexes.

There is a single genus *Bolitophila* with 16 species in Britain. They are assigned to two subgenera on whether R_{2+3} ends in R_1 (*Bolitophila* sensu stricto; as in *B. saundersii*) or in the costa (*Cliopisa*; including *B. hybrida* and *B. maculipennis*). As they are based on this character alone, these subgenera probably do not represent natural monophyletic groups.

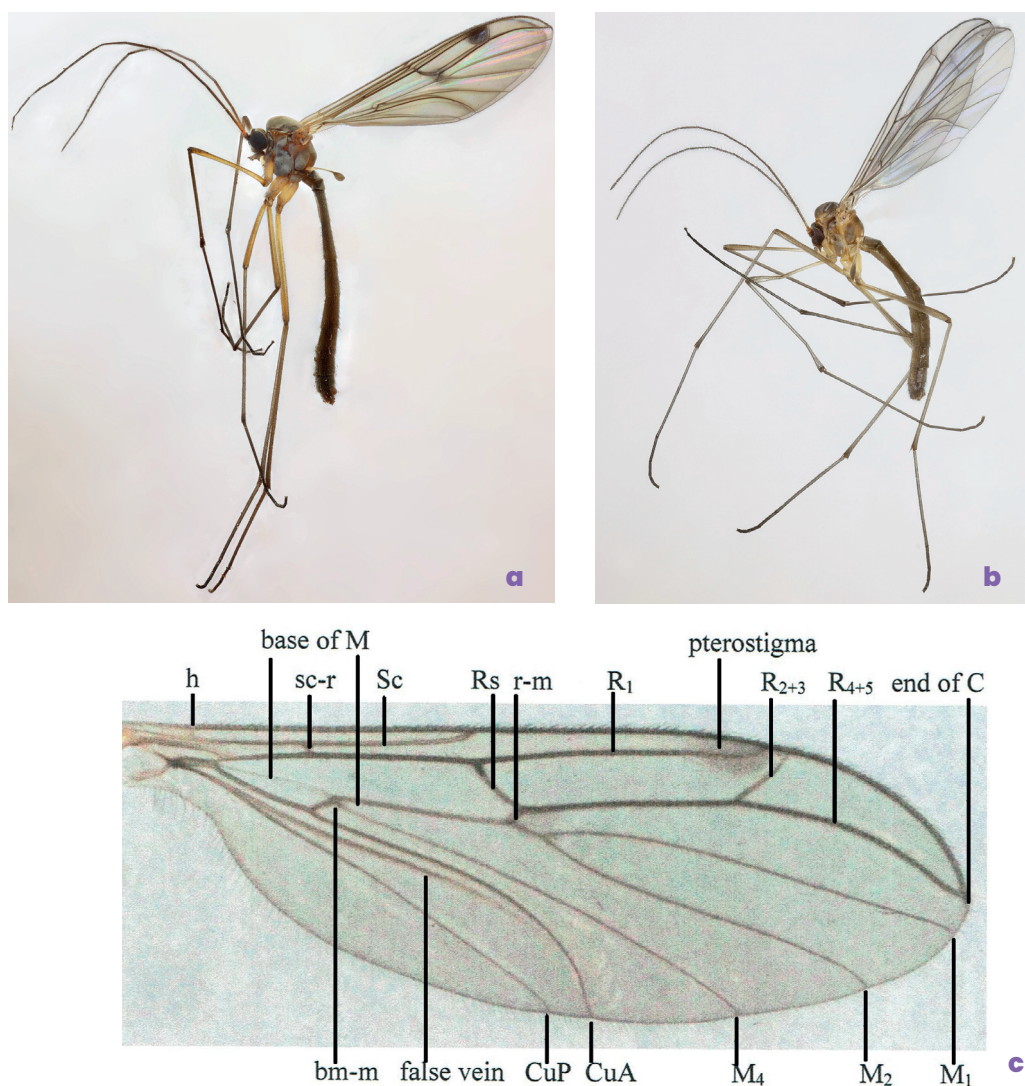


Figure 27. (a) *Bolitophila maculipennis*; (b) *Bolitophila saundersii*; (c) wing of *Bolitophila hybrida*.

Family KEROPLATIDAE

All British species have crossvein r-m replaced by the radio-medial fusion, which is unique to this family among fungus gnats. An exception to this is the Holarctic, but not British, genus *Paleoplatyura*, of which the wing venation is otherwise similar to other Keroplatidae, so clearly differing from the condition in the other families. Figure 28 shows full details of the wing venation.

Vein R_{2+3} is usually present but is always much shorter than in Ditomyiidae. It may end in R_1 (as in *Platyura marginata* and *Keroplatus*) or in the costa (as shown in the figures below of *Macrocera stigmoides*, *M. stigma* and *Isonneuromyia semirufa*).

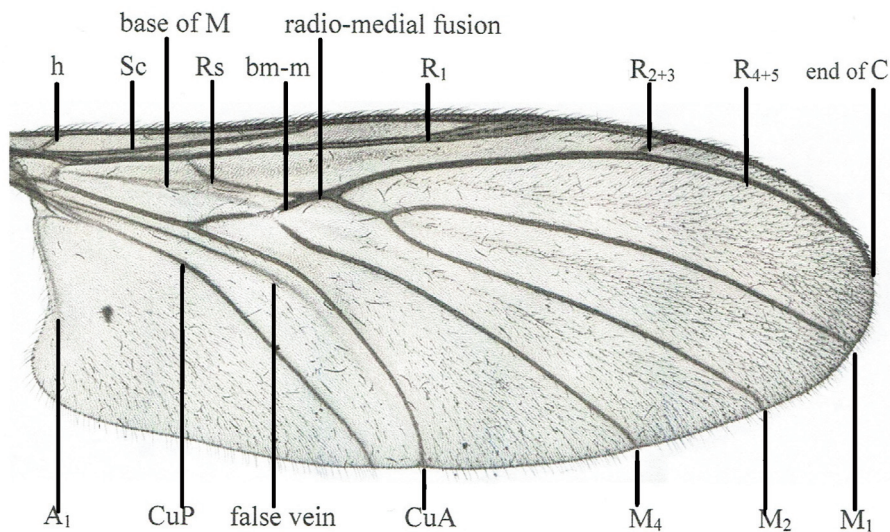


Figure 28. Wing of *Macrocera stigmoides* (keroplatidae).

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Subfamilies KEROPLATINAE and PLATYURINAE

The subfamily Platyurinae, as proposed by Mantič *et al.* (2020), was defined on DNA evidence indicating its basal position in the family, and was otherwise distinguished by a range of plesiomorphous (primitive) characters that were not unique to it within the family. It includes only *Platyura marginata* in the British fauna, while there are 28 species in 13 genera in Keroplatinae.

These groups differ from Macrocerinae in the veins of the posterior fork being divergent from the base of the fork (as indicated in the figure of *Platyura marginata*). The mid and hind tibiae may bear bristles and apical combs. The antennae are shorter than the body, and are usually cylindrical but are laterally compressed in the tribe Keroplatini. The wing membrane lacks macrotrichia.

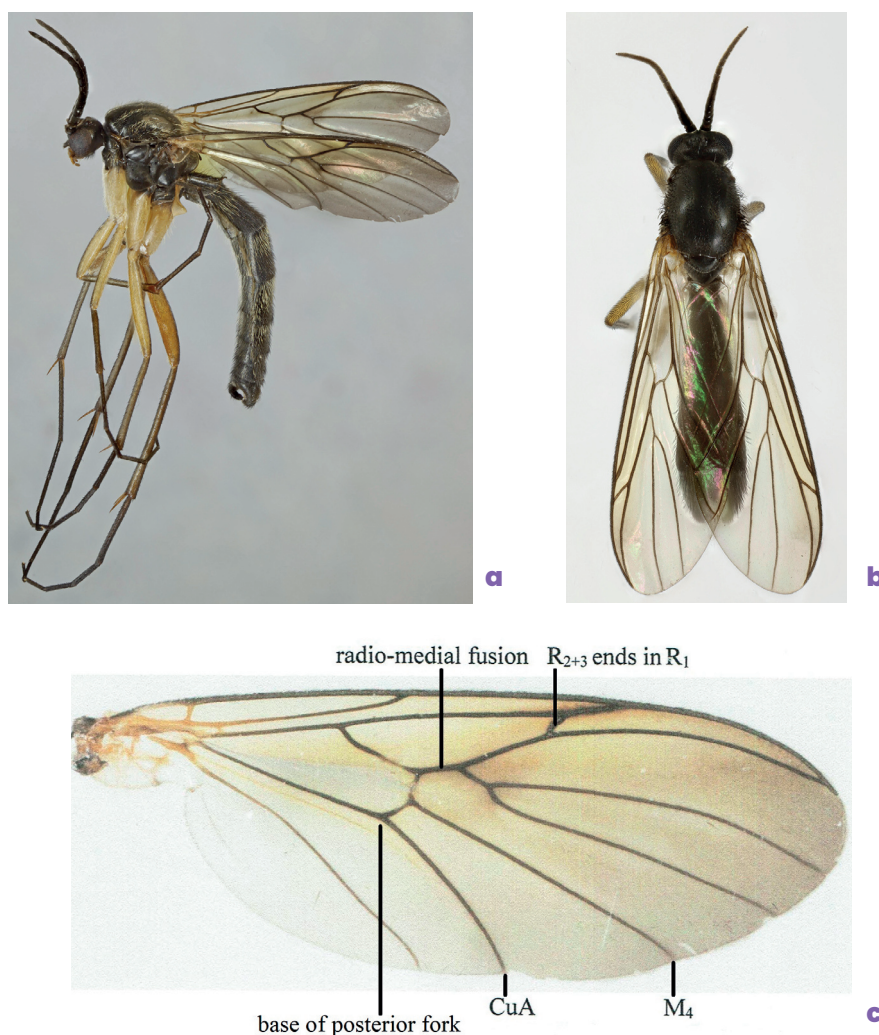


Figure 29. (a) *Platyura marginata* (Platyurinae). (b) *Isonneuromyia semirufa* (Keroplatinae). Wing of (c) *Platyura marginata* (Platyurinae).

Subfamily MACROCERINAE

The veins of the posterior fork are convergent near the base of the fork (arrowed on wing of *Macrocera stigma*), a distinction from other Keroplatidae. The mid and hind tibiae lack bristles and apical combs. In most species the antennae are as long as or longer than the body, and they are often longer in males than in females of the same species (as in *Macrocera stigma* shown here). Macrotrichia are present on the wing membrane in some species (including *M. stigma*).

In Britain this subfamily includes only the genus *Macrocera* with 22 species.



Figure 30. *Macrocera stigma* (Macrocerinae) (a) male, (b) female, (c) wing, arrow indicating convergence of veins of the posterior fork.

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Family SCIARIDAE

These are sometimes termed “black fungus gnats” as most species have mainly black bodies. *Phytosciara flavipes* shown here is unusual in its paler coloration, and is often included among fungus gnat samples for that reason. They have, however, for long been treated as a separate family from the Mycetophilidae *sensu lato*. Recognition as a family preceded the 1976 checklist and the appearance of the respective handbooks by Hutson *et al.* (1980) to Mycetophilidae and Freeman (1983) to Sciaridae, and so are excluded from fungus gnats in the sense defined here.

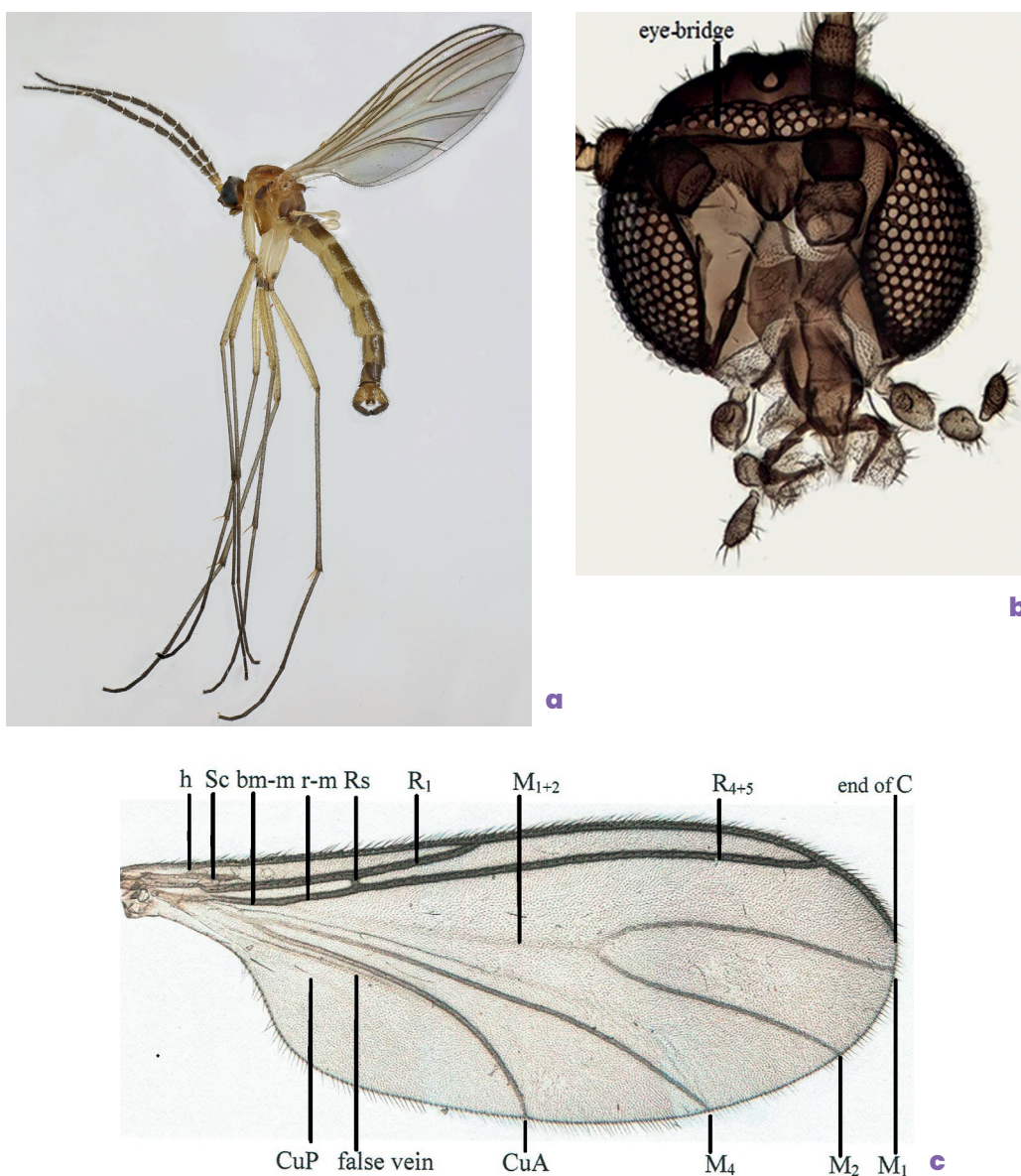


Figure 31. (a) *Phytosciara flavipes* ♂. (b) Head of *Bradysia placida*.
(c) Wing of *Bradysia fungicola*.

They differ from the fungus gnat families in the extension of the eyes onto the dorsal surface of the head, to meet in a narrow bridge (indicated on the figure of the head) above the antennae (except in *Pnyxia* which has the eyes reduced in both sexes, and wings and halteres lacking in the female). The wing has a more or less bell-shaped median fork, with its stem nearly as long as or longer than the fork (as shown in *Bradysia fungicola*). The posterior fork branches in the basal part of the wing and has a short stem. Vein CuP is weakly developed and ends remote from the wing margin.

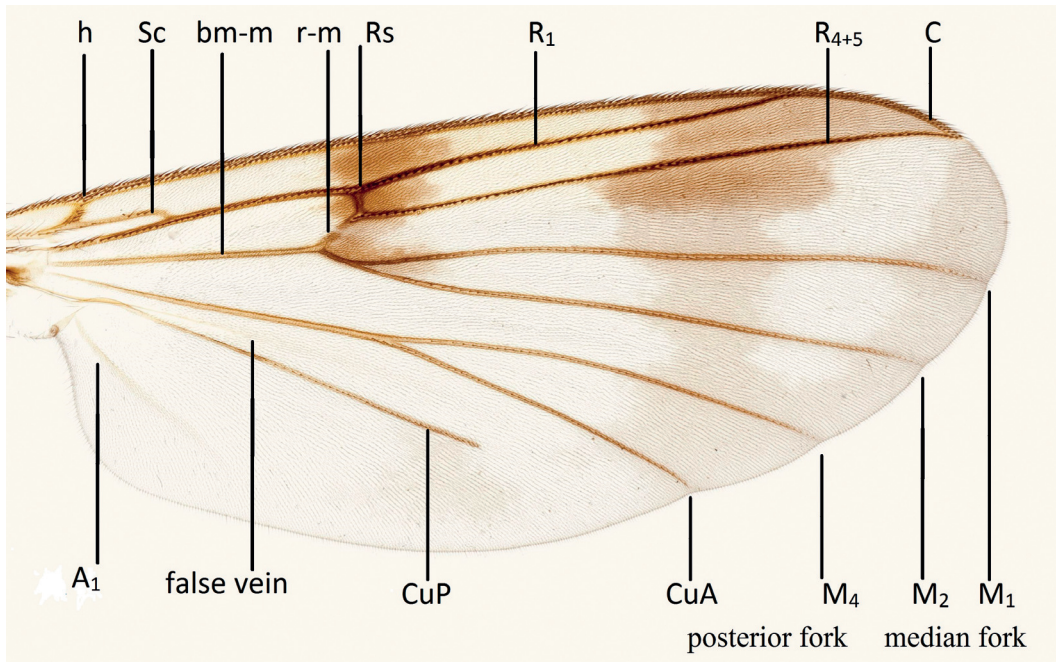
The above mentioned handbook by Freeman (1983) keyed 99 species in 18 genera. A further 25 species were added in subsequent publications during the 20th century and, based on material examined by Frank Menzel, 29 more were added in the checklist (Chandler 1998b) which then stood, after one loss to synonymy, at 152 species. Thanks to the later examination by Frank Menzel of material from a wide range of sources, including nearly 15,000 specimens, it was possible for the faunal update by Menzel *et al.* (2006) to add a further 111 species, six of them described as new, bringing the British Isles list to 263, of which two were only recorded from Ireland. An historical account of sciarid studies in the British Isles was included. With a few more recent additions, the list presently stands at 267 species in 24 genera, also taking into account many nomenclatural changes. Given the much larger European fauna, including a number of common species that had yet to be recorded in Britain, Menzel *et al.* speculated that (with better coverage of habitats and regions) many more additions and a total list exceeding 300 species could be expected.

Family MYCETOPHILIDAE

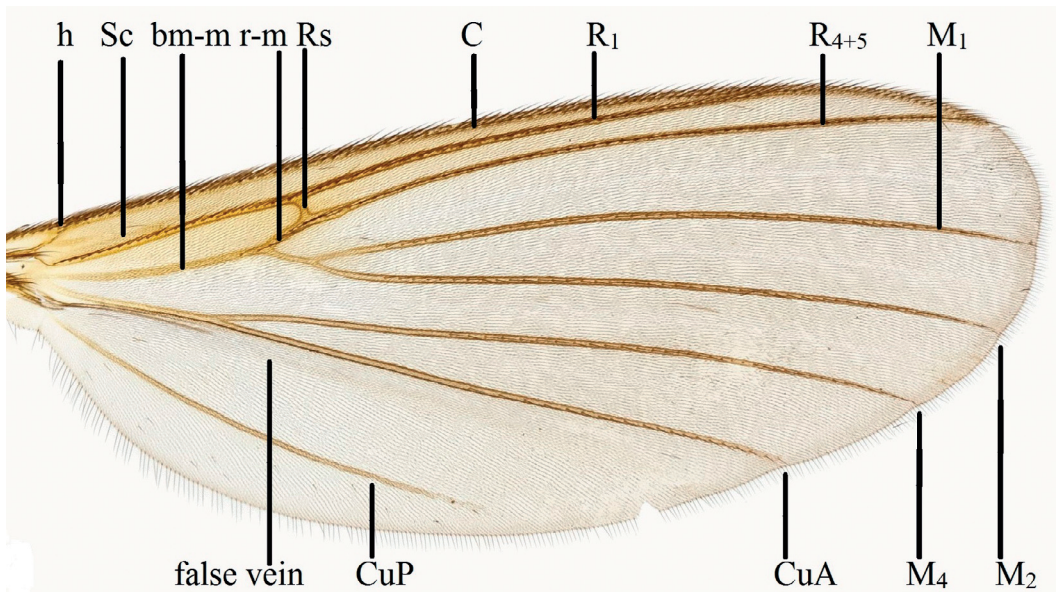
In contrast to Sciaridae the eyes are well separated dorsally. As in Sciaridae there is no crossvein joining the anterior branch of the posterior fork, which may also branch close to the base of the wing in some genera (e.g. *Ectrepesthoneura* and *Manota*), but in most Mycetophilidae it branches more distally from a long stem (as in Figs 18–20 and in *Dynatosoma* shown here; *Epicypta*, also figured below, is intermediate), except in the few cases where its anterior branch is missing (e.g. *Sceptonia* and most species of *Zygomyia*). Vein CuP usually ends well before the wing margin, except in *Platurocypta* and *Epicypta* where it almost or quite reaches the margin.

The median fork is about as long as its stem (e.g. *Mycomya*, Fig. 19) or more often much longer, and lanceolate rather than bell-shaped (as in Figs 18 and 20, and in all members of the subfamily Mycetophilinae including the examples shown here). This fork is rarely absent, e.g. where M_{1+2} is unbranched in the genus *Azana* (Sciophilinae).

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a



b

Figure 32. Wing of: (a) *Dynatosoma reciprocum*; (b) *Epicypta limnophila*.

Keys to the subfamilies and some genera of Mycetophilidae

The subfamily Manotinae, with a single British species and the subfamily Mycetophilinae covered here are unchanged in status from Hutson *et al.* (1980). The four tribes recognised in subfamily Sciophilinae by Hutson *et al.* (*op. cit.*) are raised to subfamily rank; the Mycomyinae are unchanged in composition but the generic composition of the other three groups differs in some respects. Genera which have changed their assignment (sometimes more than once) are here keyed separately. The positions of some are not yet fully resolved (see above section on phylogeny). No attempt has been made to include taxa not found in the British Isles; the key to Palaearctic genera by Söli *et al.* (2000) should enable identification of all genera found in this Region.

1. Back of head flat or slightly concave, with a row of strong posteriorly directed bristles behind eye. Antennae inserted near top of head (their base arrowed). Stem of median fork absent, its branches being detached veins (base of median fork arrowed). Tibial setulae in regular rows (1 British species *Manota unifurcata*) Manotinae

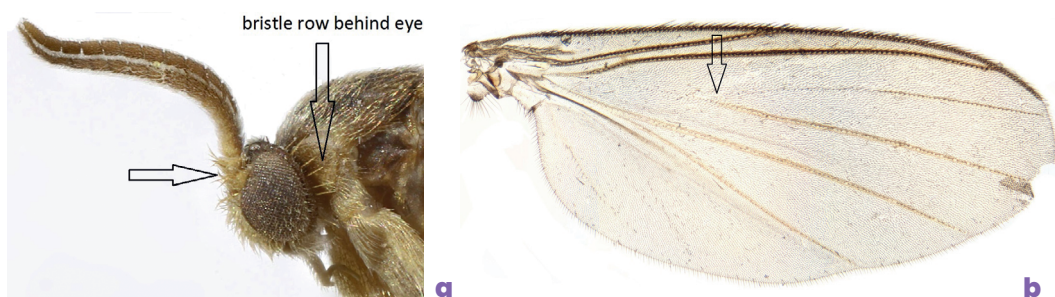


Figure 33. *Manota unifurcata*: (a) head showing bristle row behind eye; (b) wing, base of median fork arrowed.

- Back of head convex (as in figure of *Mycomya annulata* head) and without a row of strong bristles behind eye. Antennae inserted near middle of head. Stem of median fork present and fork usually complete, sometimes one branch abbreviated at the point of forking 2
2. Wing membrane with microtrichia always present and arranged in more or less regular longitudinal lines (as in figures of *Exechia macula*), particularly near posterior margin (less evident in *Phronia* and *Trichonta*); macrotrichia usually absent, or at most a few on anal lobe.

Vein Sc ending free or in R (in the latter case always well before the base of Rs). R_{2+3} always absent. Lateral ocelli close to eye margins. Laterotergite bristled. Tibiae with fine setulae in regular rows Mycetophilinae (p. 79)

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- Wing membrane with microtrichia irregularly arranged (as in figures of *Mycomya annulata*), with macrotrichia present or absent. If microtrichia are absent (some *Sciophila* species) macrotrichia are present.

Other characters may be as Mycetophilinae or variously differing, i.e. Sc may end in the costa (as in Fig. 18) or if it ends in R this may be beyond the base of Rs (as in Fig. 19), R_{2+3} may be present (but if so it always ends in R_1 , forming a radial cell, as in Figs 18 and 19), the lateral ocelli may be remote from the eye margins, the laterotergite may be bare, and the tibial setulae are irregular (except in Mycomyinae)
 (Sciophilinae sensu lato) ... 3

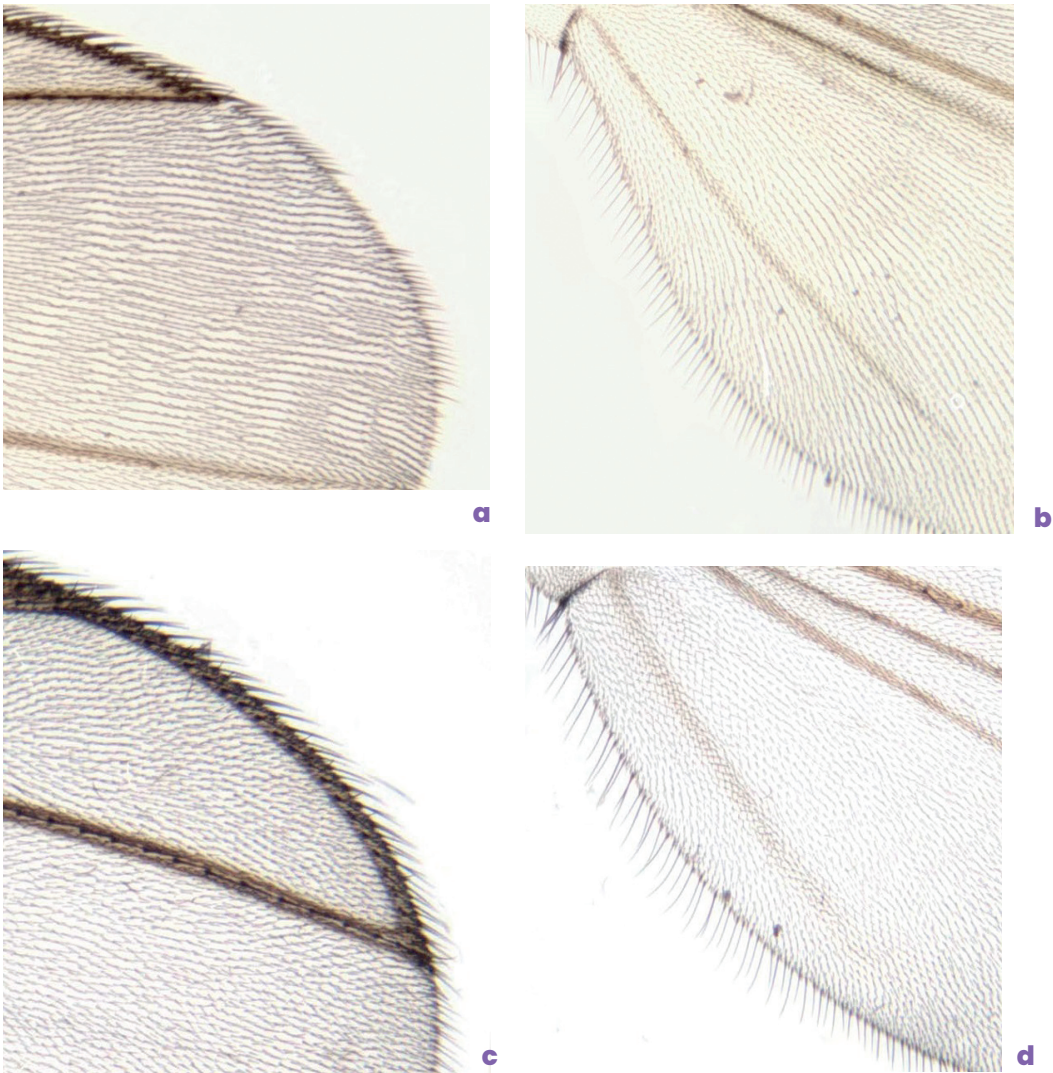


Figure 34. *Exechia macula*: (a) wing tip including apex of veins R_{4+5} and M_1 ; (b) anal lobe *Mycomya annulata*: (c) wing tip including apex of vein R_{4+5} ; (d) anal lobe.

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3. Tibiae with fine setulae in regular longitudinal rows. Only two ocelli, placed close together on top of head (both characters as in figures of *Mycomya annulata*) Mycomyinae
- Tibiae with fine setulae irregularly arranged, at most slightly linear towards tip (as in figure of *Acnemia nitidicollis*). Three ocelli present, or if only two are apparent they are widely separated 4

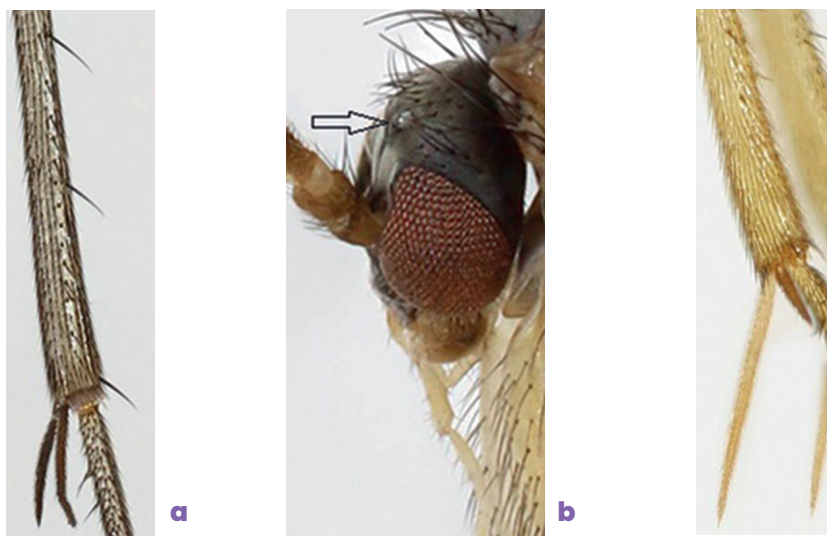


Figure 35. *Mycomya annulata*: (a) apex of hind tibia, setulae in rows, (b) head, position of ocelli arrowed. (c) *Acnemia nitidicollis* apex of hind tibia, setulae irregular except near tip.

4. Wing membrane with macrotrichia, usually over most of surface (as in figures of *Neuratelia nemoralis* and *Eudicrana nigriceps*; mainly restricted to apical half in *Paratinia*) 5
- Wing membrane without macrotrichia 8

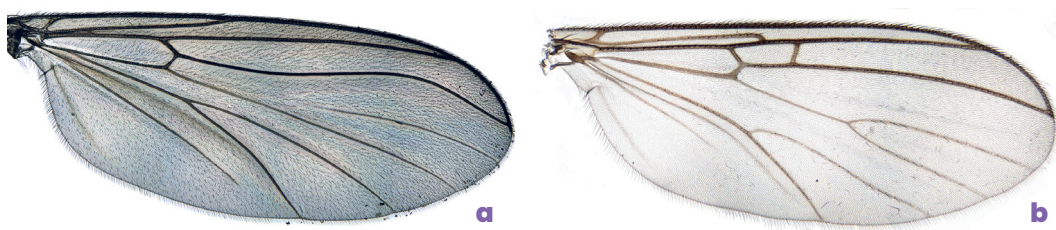


Figure 36. (a) *Neuratelia nemoralis* uniform macrotrichia on membrane, Sc ending in costa, R_{2+3} absent. (b) *Mycomya annulata* Sc ending in R_1 , R_{2+3} present ending in R_1 .

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5. Only two ocelli, which are contiguous with eye margins. Mediotergite clothed with small fine setulae as well as strong bristles apically (wing illustrated shows its distinctive venation) *Eudicrana*
- Three ocelli present, of which the laterals are not contiguous with eye margins, although sometimes close (e.g. *Paratinia*, *Phthinia*) 6
6. Mediotergite with bristles (arrowed in figure of *Acnemia nitidicollis*) Sciophilinae
- Mediotergite bare (see figure of *Paratinia sciarina*) 7

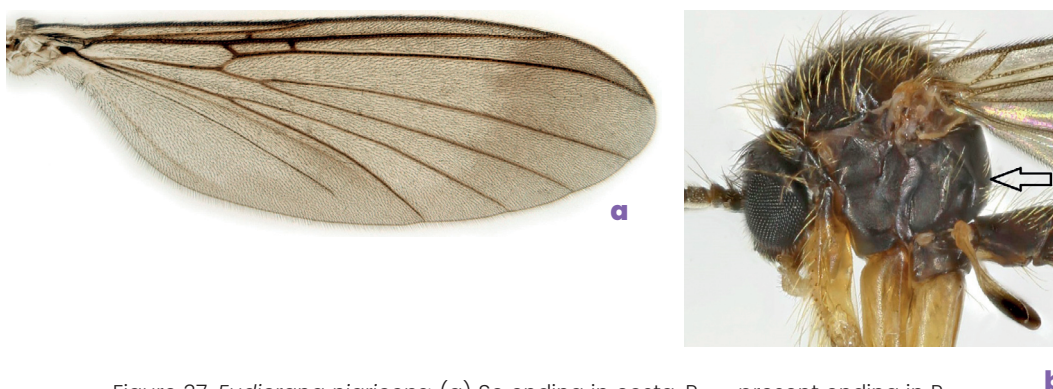


Figure 37. *Eudicrana nigriceps*: (a) Sc ending in costa, R_{2+3} present ending in R_1 .
Acnemia nitidicollis: (b) mediotergite with bristles.

7. Wing membrane with macrotrichia mainly on apical half Sciophilinae (*Paratinia*)
- Wing membrane with macrotrichia evenly distributed (as in figure of *Neuratelia nemoralis*) Gnoristinae [ex Sciophilinae] (*Sytemna*)



Figure 38. Wing of *Paratinia sciarina* macrotrichia mainly on apical half of wing; Sc ending in costa, R_{2+3} present ending in R_1 ; arrow = bare mediotergite.

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8. Mediotergite with a transverse row of bristles
 Gnoristinae [ex Sciophilinae] (*Coelophthiria*)
- Mediotergite bare (as in figure of *Paratania sciarina*) 9
9. Vein R_1 long, at least four times as long as crossvein r-m, which is usually more or less oblique or vertical (as in figure of *Synapha vitripennis*) 10
- Vein R_1 less than three times as long as r-m, which is longer and more horizontal in position (as in figure of *Docosia sciarina*) 11

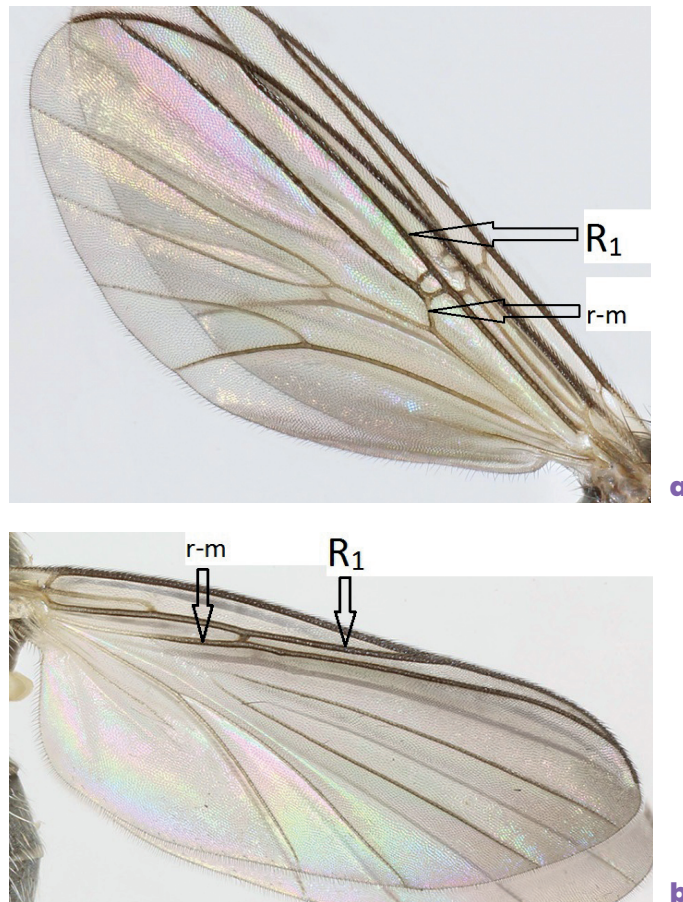


Figure 39. Wing of: (a) *Synapha vitripennis* (Gnoristinae) Sc ending in costa, R_{2+3} present but close to R_s ; (b) *Docosia sciarina* (Leiinae) Sc ending in R , R_{2+3} absent.

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10. Abdomen with segment 7 large in both sexes and segment 8 also visible externally
..... Gnoristinae [ex Sciophilinae] (*Speolepta*)
- Abdomen with segment 7 small and usually retracted, at least in the male
..... Gnoristinae (most genera)
11. Laterotergite bristled (arrowed in figure of *Docosia sciarina*)
..... Leiinae (most genera, including some *Docosia*)
- Laterotergite bare 12
12. Lateral ocelli near eye margins (arrowed in figure of *Docosia sciarina*)
..... Leiinae (some *Docosia*; others including *D. sciarina* have laterotergite bristled)
- Lateral ocelli remote from eye margins (arrowed in figure of *Tetragoneura sylvatica*)
..... Gnoristinae [ex Leiinae] (*Tetragoneura*, *Ectrepesthoneura*)

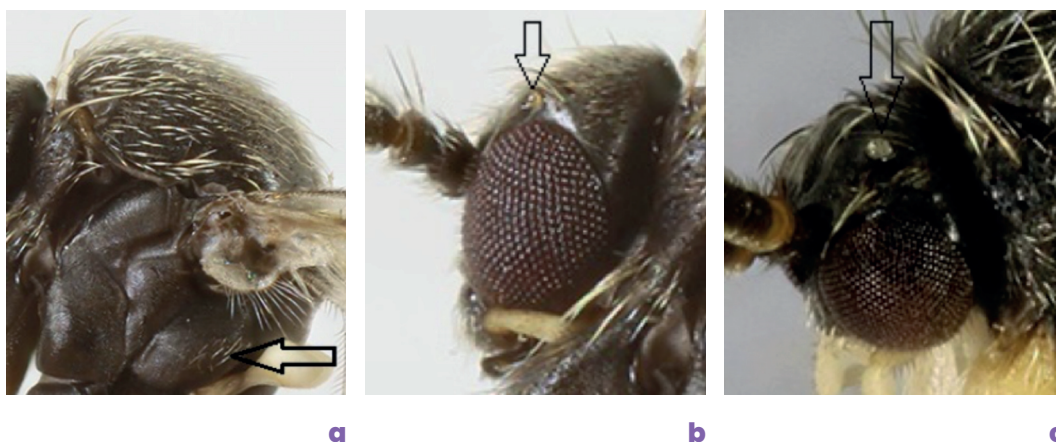


Figure 40. *Docosia sciarina*: (a) laterotergite bristled; (b) lateral ocellus near eye margin.
Tetragoneura sylvatica: (c) lateral ocellus remote from eye margin.

Key to Tribes and Genera of Subfamily Mycetophilinae

1. Anepisternum bare or with short weak bristles (longer bristles present only in *Cordyla*, which has antepenultimate segment of palpi enlarged, especially in male) Tribe EXECHIINI (p. 80)

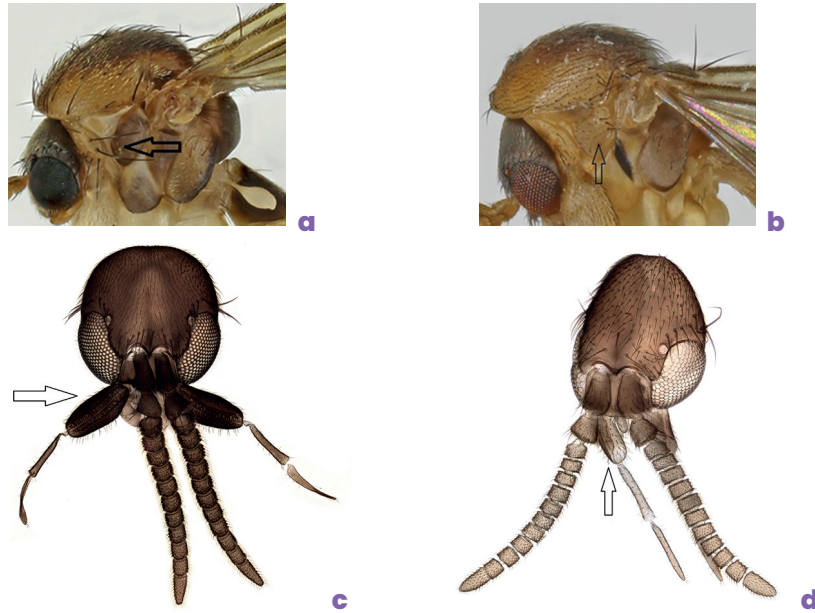


Figure 41. Thorax with anepisternum arrowed: (a) *Exechia contaminata*; (b) *Cordyla flaviceps*.
Enlarged segment of palpus: (c) *Cordyla crassicornis* ♂; (d) *Cordyla parvipalpis* ♂.

- Anepisternum with strong bristles at least near hind margin, often scattered bristles elsewhere on surface. Antepenultimate segment of palpi not enlarged relative to other segments Tribe MYCETOPHILINI (p. 88)



Figure 42. Thorax with anepisternum arrowed: (a) *Mycetophila perpallida*; (b) *Sceptonia nigra* ♂.

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Tribe EXECHIINI

Lower part of katepisternum with an evenly rounded dilation overlapping the base of the mid coxa. Hind coxa usually with a strong dark posterobasal bristle or a cluster of shorter bristles (*Cordyla*), rarely lacking (some *Anatella* species). Hind tibia without a distinct posterior comb at tip

Usually more slender gnats with longer legs, which hold the mid legs raised above the body in resting position. The wing is illustrated for all genera, whether or not it relates to key characters.

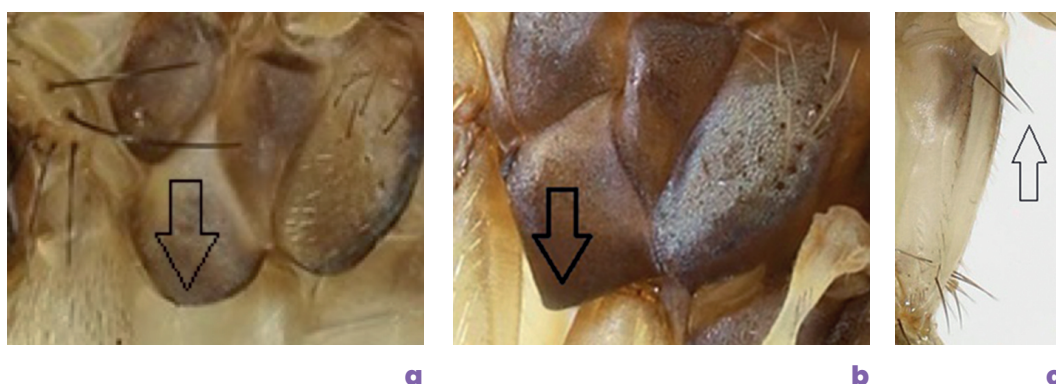


Figure 43. Lower edge of katepisternum arrowed: (a) *Exechia contaminata* (Exechiini); (b) *Phronia humeralis* (Mycetophilini). (c) *Exechia seriata* hind coxae.

Key to genera of Tribe EXECHIINI

1. Antepenultimate segment of palpi enlarged, especially in male (see examples illustrating tribal key above). Lower part of anepimeron with a sharply delimited black spot (arrowed) near front margin. Anepisternum with strong bristles near hind margin (arrowed) and scattered bristles dorsally. Vein M_2 abbreviated (arrowed) (except *C. crassicornis*) *Cordyla* Meigen (p. 143)
- Palpi without a swollen segment. Anepimeron without such a black spot. Anepisternum without any strong bristles 2
2. Costa distinctly produced well beyond tip of vein R_{4+5} (arrowed) *Anatella* Winnertz (p. 102)
- Costa ending at or only just beyond tip of vein R_{4+5} 3

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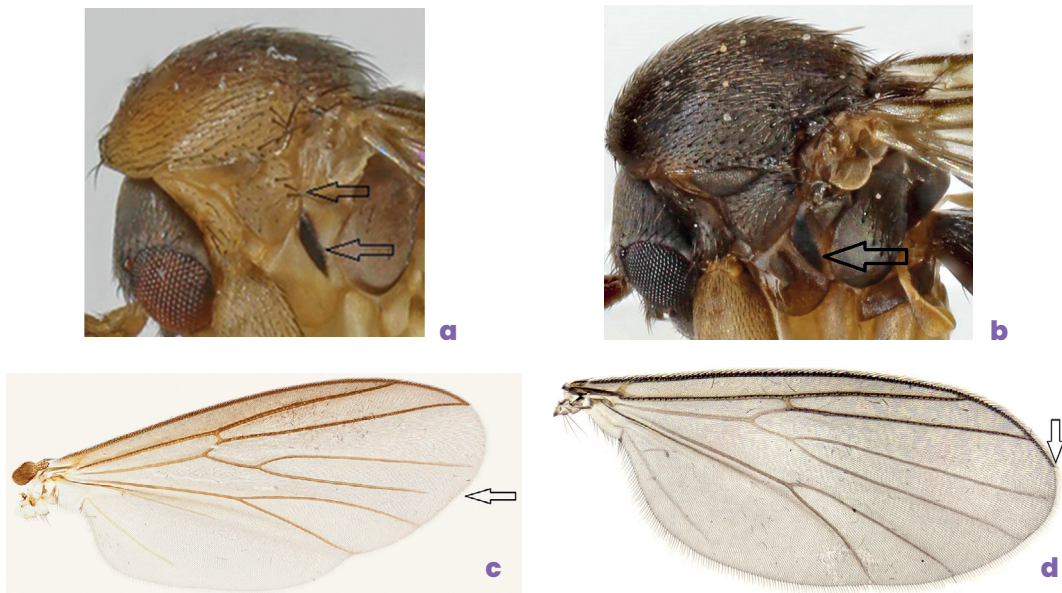


Figure 44. Thorax of: (a) *Cordyla flaviceps*; (b) *Cordyla murina*. Wing of: (c) *Cordyla semiflava*; (d) *Anatella longisetosa*.

3. Base of posterior fork (arrowed in figure of *Pseudexechia aurivernica*) beyond that of median fork, the veins of both forks usually bare. Anepisternum bare. Hind tibia with series of short posterior bristles near tip 4
- Base of posterior fork usually well before, sometimes opposite or just beyond that of the median fork (arrowed in figure of *Stigmatomeria crassicornis* as an example) 7



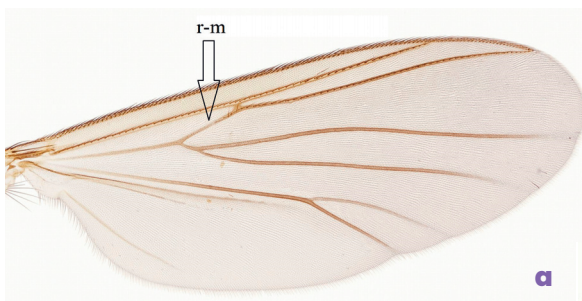
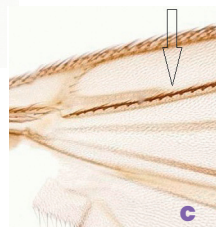
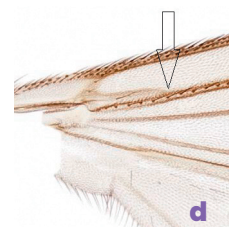
Figure 45. Wing of: (a) *Pseudexechia aurivernica*; (b) *Stigmatomeria crassicornis*.

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4. Mesonotum without strong erect bristles centrally (arrowed in figure of *P. trivittata*), often with three darker stripes. Stem of median fork subequal to crossvein r-m. Paler abdominal markings when present broadest along hind margins of tergites *Pseudexechia* Tuomikoski (p. 196)
- Mesonotum with strong erect bristles centrally, usually well developed (arrowed in figure of *Exechiopsis hammi*) 5

**a****b**Figure 46. Thorax of: (a) *Pseudexechia trivittata*; (b) *Exechiopsis hammi*.

5. Vein Sc ending free (as in figure of *E. seriata*). Crossvein r-m more than twice as long as stem of median fork (as in figure of *E. dorsalis*). Veins R_{4+5} and M_1 divergent on apical half. Proepisternum with 2-4 bristles. Pale abdominal markings when present usually broadest towards bases of tergites *Exechia* Winnertz (p. 154)
- Vein Sc more or less distinctly ending in R (as in figures of *E. clypeata* and *E. leptura*). Crossvein r-m usually not more than twice as long as stem of median fork. Veins R_{4+5} and M_1 not divergent apically. Proepisternum with 1 strong bristle, a second shorter one sometimes present. Pale abdominal markings when present broadest along hind margins of tergites (markings are on fore margins in *E. seducta*) (*Exechiopsis* Tuomikoski) ... 6

**a****b****c****d**Figure 47. (a) Wing of *Exechia dorsalis*. Vein Sc arrowed: (b) *Exechia seriata*; (c) *Exechiopsis clypeata*; (d) *Exechiopsis leptura*.

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6. Hind tibia with a dorsal excavation at tip (arrowed in figure of *E. hammi*) and posterior apical margin distinctly oblique. Vein R_{4+5} downturned apically and convergent with vein M_1 (arrowed in figure of *E. clypeata*) Subgenus *Exechiopsis* sensu stricto (p. 176)
- Hind tibia with dorsal excavation absent or poorly developed and apical margin not conspicuously oblique (arrowed in figure of *E. crucigera*). Vein R_{4+5} not so markedly downturned apically and may be more or less parallel with vein M_1 (arrowed in figure of *E. leptura*) Subgenus *Xenexechia* Tuomikoski (p. 188)

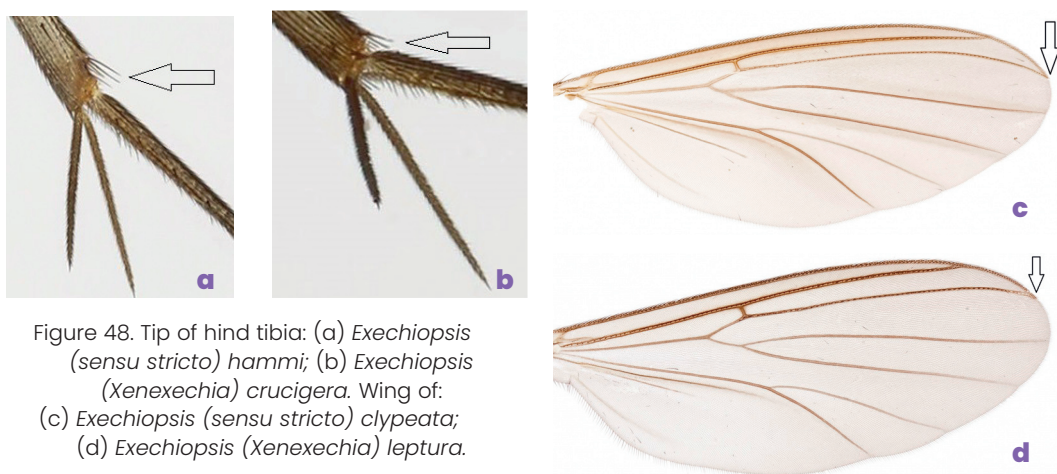


Figure 48. Tip of hind tibia: (a) *Exechiopsis* (sensu stricto) *hammi*; (b) *Exechiopsis* (*Xenexechia*) *crucigera*. Wing of: (c) *Exechiopsis* (sensu stricto) *clypeata*; (d) *Exechiopsis* (*Xenexechia*) *leptura*.

7. Veins of median fork and usually also posterior fork bearing setulae above at least near tip (as in figure of *Brachypeza radiata*) 8
- Veins of both forks bare 15

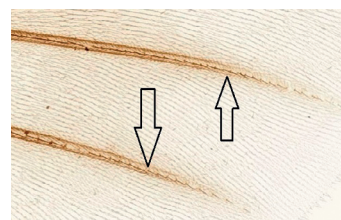


Figure 49. *Brachypeza radiata* apical part of median fork.

8. Vein Sc ending free (as in figure of *Pseudobrachypeza helvetica*) 9
- Vein Sc ending in R (as in figure of *Brachypeza armata*) 10

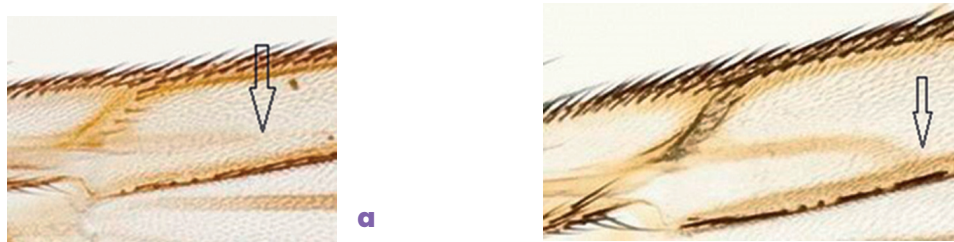


Figure 50. (a) *Pseudobrachypeza helvetica* Sc ends free. (b) *Brachypeza armata* Sc ends in R.

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9. False vein (arrowed) very long and distinct, reaching beyond middle of posterior fork. Mid and hind coxae without black mark apically (1 species) *Pseudobrachypeza* Tuomikoski (p. 202)
- False vein shorter (arrowed). Mid and hind coxae with a black patch near tip externally (arrowed) (1 species) *Stigmatomeria* Tuomikoski (p. 215)

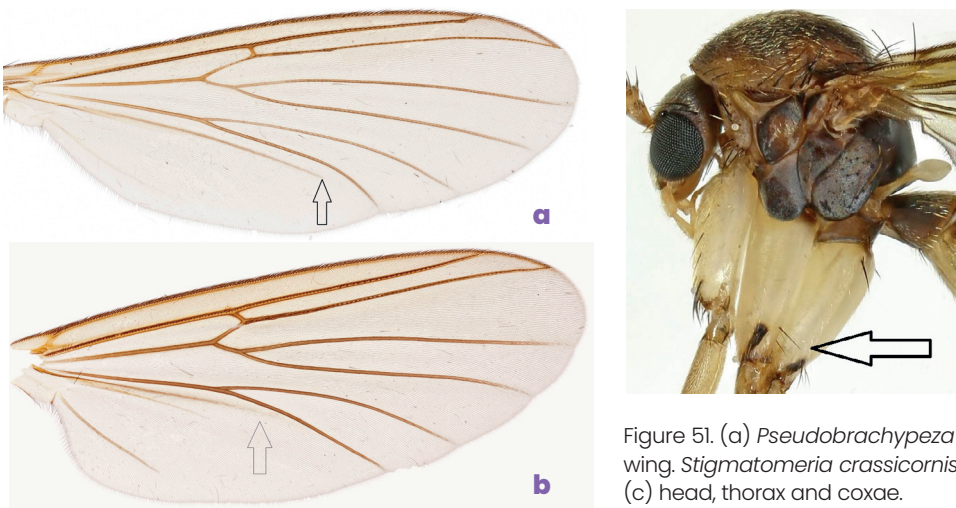


Figure 51. (a) *Pseudobrachypeza helvetica* wing. *Stigmatomeria crassicornis*: (b) wing; (c) head, thorax and coxae.

10. False vein (apex arrowed in figure of *B. radiata*) very long and distinct, reaching well beyond middle of posterior fork. Body stout and legs strong. Antennae short, flagellomeres 2-13 shorter than broad (arrowed in figure of *B. bisignata*) *Brachypeza* Winnertz (p. 122)
- False vein (apex arrowed in figure of *Pseudorymosia fovea*) more weakly developed. Body and legs more slender. Antennae usually longer with flagellomeres at least as long as broad (as in *Notolopha*), usually longer than broad (as arrowed in figure of *Allodiopsis rustica*) 11



Figure 52. (a) Wing of *Brachypeza radiata*. Thorax of: (b) *Brachypeza bisignata*; (c) *Allodiopsis rustica*.

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11. Pale abdominal markings situated towards bases of tergites (1 species) *Pseudorymosia* Tuomikoski (p. 203)
- Pale abdominal markings broadest along hind margins of tergites 12

Figure 53. Wing of *Pseudorymosia fovea*.

12. Only one pair of strong scutellar bristles and two proepisternal bristles. Mesonotum without strong bristles centrally, mostly clothed with pale setulae (except for *S. ingeniosa* which has dorsocentral rows present posteriorly) *Synplasta* Skuse (p. 217)
- Two pairs of strong scutellar bristles and 3 or 4 proepisternal bristles. Mesonotum with central bristles always more or less developed, at least in dorsocentral rows posteriorly 13

Figure 54. Wing of *Synplasta gracilis*.

- 13 Mesonotum clothed with dark setulae and bearing well developed rows of dorsocentral bristles. Anepisternum with dark setulae (1 species) *Myrosia* Tuomikoski (p. 193)
- Mesonotum clothed with pale setulae. Anepisternum bare 14

Figure 55. *Myrosia maculosa*.

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14. Antennae with flagellomeres short, about as long as broad and bearing short stiff bristles. Mesonotum with bristles in dorsocentral rows (arrowed) thick and blunt (in the single British species) *Notolopha* Tuomikoski (p. 194)
- Antennae with flagellomeres longer and without any conspicuous bristles. Mesonotum with bristles in dorsocentral rows normally tapered, not thickened or blunt *Allodiopsis* Tuomikoski (p. 98)

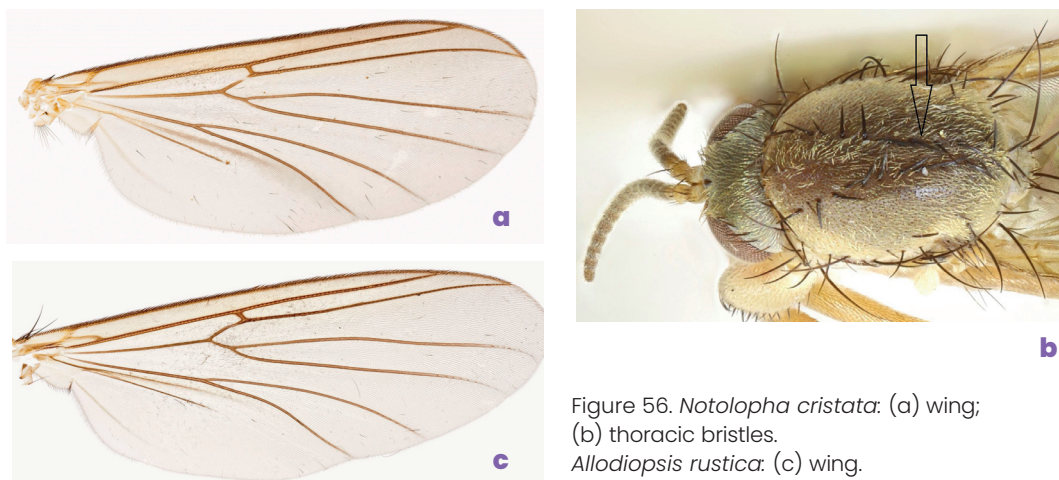


Figure 56. *Notolopha cristata*: (a) wing;
(b) thoracic bristles.
Allodiopsis rustica: (c) wing.

15. Vein Sc ending free, although close to R (arrowed). Male genitalia with gonocoxites fused ventrally with at most a shallow excavation, with hypandrial lobe at most weakly developed. Female cercus one-segmented *Rymosia* Winnertz (p. 204)

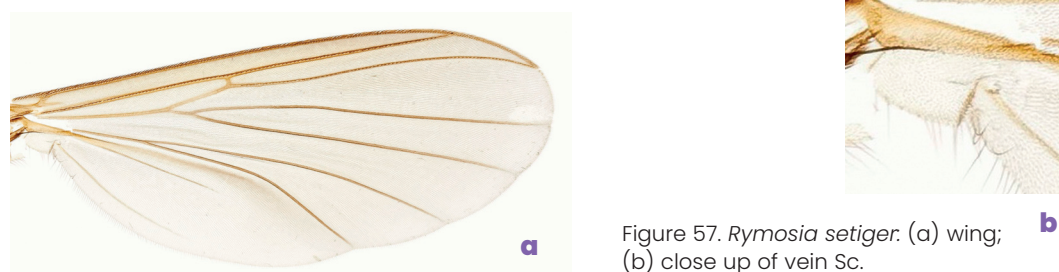
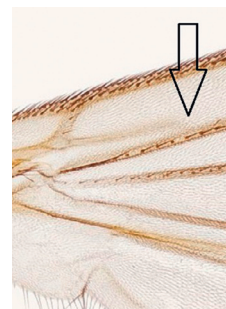


Figure 57. *Rymosia setiger*: (a) wing;
(b) close up of vein Sc.

- Vein Sc ending in R (arrowed in figure of *Tarnania nemoralis*). Male genitalia with gonocoxites with a more or less deep apical medial excavation, containing a well-developed hypandrial lobe. Female cercus two-segmented 16

Figure 58. *Tarnania nemoralis* close up of vein Sc.



16. Hind tibia with a dense patch of short posterior bristles near tip, arranged irregularly in approximately three rows. False vein (right arrow) strong, extending for more than half length of posterior fork; CuP (left arrow) also strong *Tarnania* Tuomikoski (p. 220)

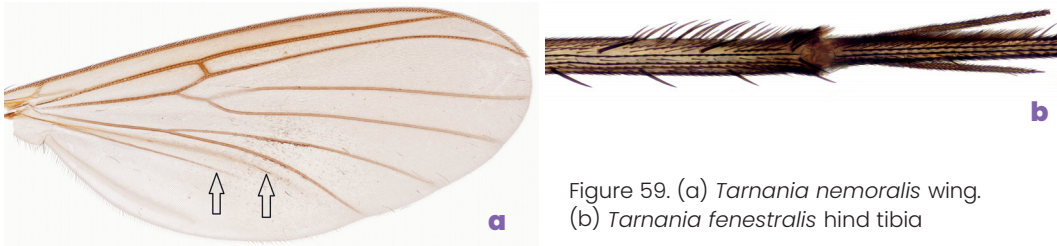


Figure 59. (a) *Tarnania nemoralis* wing.
(b) *Tarnania fenestralis* hind tibia

- Hind tibia with posterior bristles in a single row or absent. False vein and CuP weakly developed, false vein extending half or less length of posterior fork (arrowed in wing figures) 17

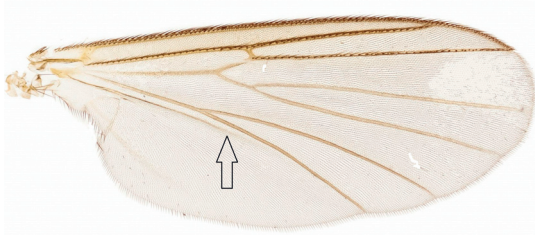


Figure 60. *Brevicornu griseolum* wing.

17. Mesonotum with strong bristles irregularly dispersed and decumbent (as in figure of *B. verralli*). Three or more proepisternal bristles *Brevicornu* Marshall (p. 125)
- Mesonotum with strong bristles only near margins, if present centrally arranged in two dorsocentral rows. Two or three proepisternal bristles 18



Figure 61. Thorax of: (a) *Brevicornu verralli*; (b) *Brachycampta alternans*; (c) *Allodia lugens*.

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18. Mesonotum with strong bristles only near margins (as in figure of *A. lugens*). Pale abdominal markings, when present, broader towards hind margins of tergites *Allodia* Winnertz (p. 93)
- Mesonotum with distinct erect bristles in dorsocentral series (as in figure of *B. alternans*), extending almost to front margin. Pale abdominal markings, when present, broader towards bases of tergites *Brachycampta* Winnertz (p. 114)



Figure 62. Wing of: (a) *Allodia lugens*; (b) *Brachycampta barbata*.

Tribe MYCETOPHILINI

Lower border of katepisternum with distinct anterior margin, not covering the base of the mid coxa. Hind coxa usually without a long dark posterobasal bristle; if a bristle is present (some *Trichonta* and *Dynatosoma* species) it is often pale. Hind tibia with a posterior comb usually obvious.

Compared to Exechiini, they are often more strongly built gnats with shorter legs, which (unlike Exechiini) do not hold the mid legs raised above the body in resting position.

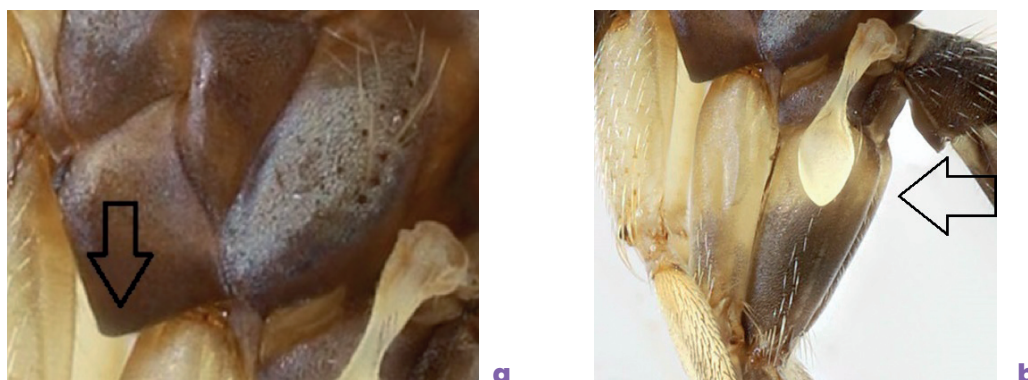


Figure 63. *Phronia humeralis*: (a) katepisternum; (b) hind coxa without posterobasal bristle.

Key to genera of Tribe MYCETOPHILINI

1. Anepimeron with bristles absent (a few minute setulae may be present on upper part in *Trichonta*) 2
- Anepimeron with a series of strong bristles near upper margin 5



Figure 64. (a) *Phronia humeralis* anepimeron bare. (b) *Mycetophila perpallida* anepimeron bristled.

2. Tibial bristles long and strong, the longest about 3 times tibial diameter. Wings strongly marked with median and preapical brown markings *Dynatosoma* Winnertz (p. 223)
- Tibial bristles small, at most a little longer than the diameter of the tibia. Wings unmarked or if markings present they are less distinct and more restricted 3
3. Base of posterior fork below or before that of the median fork, if beyond (*T. vulcani*, *T. tristis* and sometimes *T. icenica*) posterior fork more than half as long as median fork *Trichonta* Winnertz (p. 341)
- Base of posterior fork well beyond that of the median fork and posterior fork less than half length of median fork 4



Figure 65. Wing of: (a) *Trichonta vitta*, (b) *Trichonta vulcani*. Base of posterior fork arrowed.

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4. Costa extending almost halfway from R_{4+5} to M_1 (arrowed). Posterior fork (arrowed) very short, less than a third length of median fork (1 species) *Macrobrachius* Dziedzicki (p. 231)
- Costa extending at most a third of the distance from R_{4+5} to M_1 (e.g. *P. basalis*, arrowed; *P. humeralis* is more typical of genus in having a shorter costal extension). Posterior fork (arrowed) distinctly more than a third length of median fork *Phronia* Winnertz (p. 298)

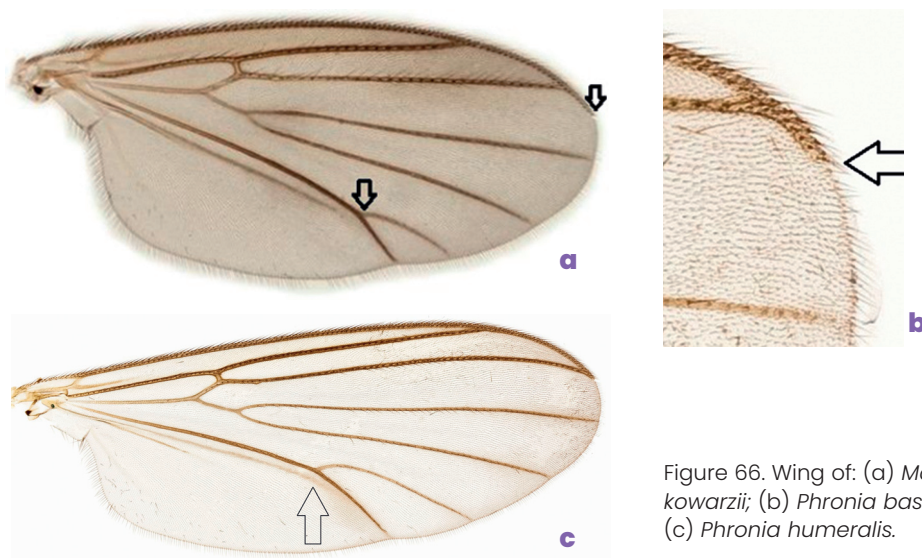


Figure 66. Wing of: (a) *Macrobrachius kowarzii*; (b) *Phronia basalis*; (c) *Phronia humeralis*.

5. Posterior fork absent (vein CuA extended unforked to wing margin) or if present (*Zygomyia semifusca*, arrowed) less than half length of median fork 6
- Posterior fork present and never much shorter than median fork 7

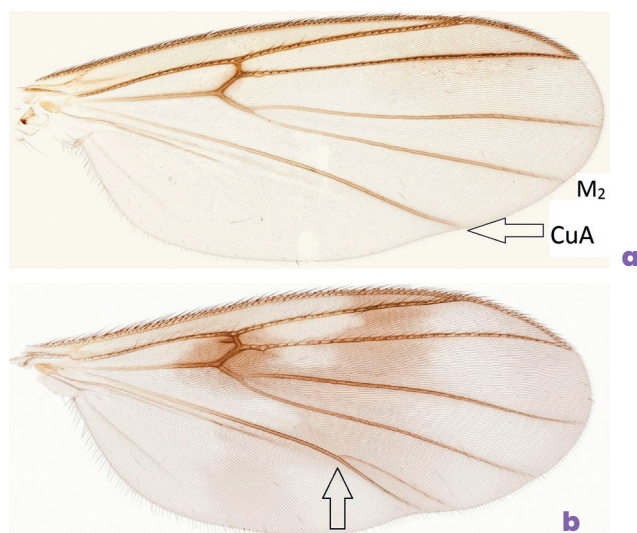
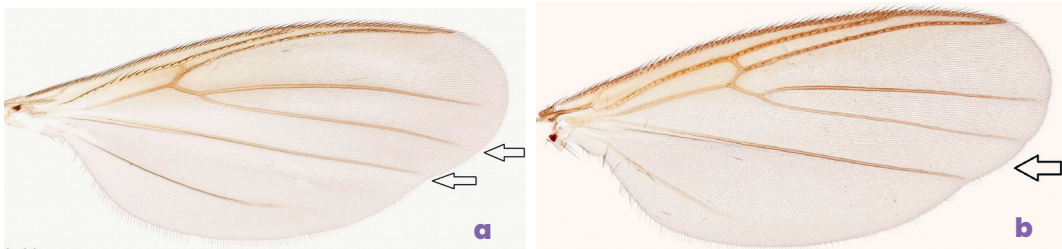


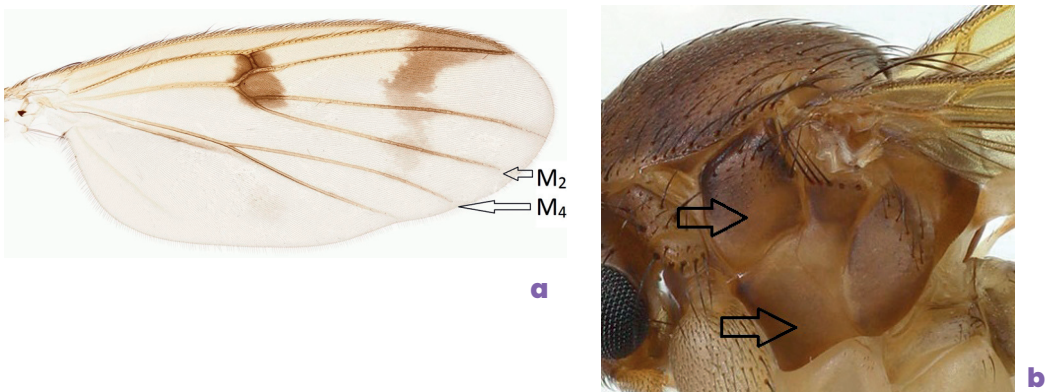
Figure 67. Wing of: (a) *Zygomyia vara*; (b) *Zygomyia semifusca*.

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6. Veins M_2 and CuA divergent (as in figure of *Zygomyia vara*). Mid tibia with one or more strong ventral bristles *Zygomyia* Winnertz (p. 363)
- Veins M_2 and CuA nearly parallel (these veins arrowed in figure of *Sceptonia costata*, the gap between arrowed in figure of *S. fumipes*). Mid tibia with ventral bristles weak or absent *Sceptonia* Winnertz (p. 330)

Figure 68. Wing of: (a) *Sceptonia costata*; (b) *Sceptonia fumipes*.

7. Vein M_4 a little divergent from M_2 apically (as in figure of *M. eppingensis*) but parallel or slightly convergent with CuA. Anepisternum (upper arrow in figure of *M. perpallida*) not much longer than broad (except in *M. unicolor* Stannius) and katepisternum (lower arrow) almost quadrate *Mycetophila* Meigen (p. 232)
- Vein M_4 parallel with M_2 throughout (lower two arrows in figures of both genera) and slightly divergent from CuA. Anepisternum and katepisternum distinctly longer than broad 8

Figure 69. (a) Wing of *Mycetophila eppingensis*. (b) *Mycetophila perpallida* anepisternum and katepisternum.

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8. Costa distinctly produced beyond tip of R_{4+5} (upper arrow). Second abdominal segment without a pair of bristles on the sternite *Platurocypta* Enderlein (p. 327)
- Costa ending at tip of R_{4+5} (upper arrow). Second abdominal segment with a pair of long bristles on the sternite (in both sexes) *Epicypta* Winnertz (p. 228)

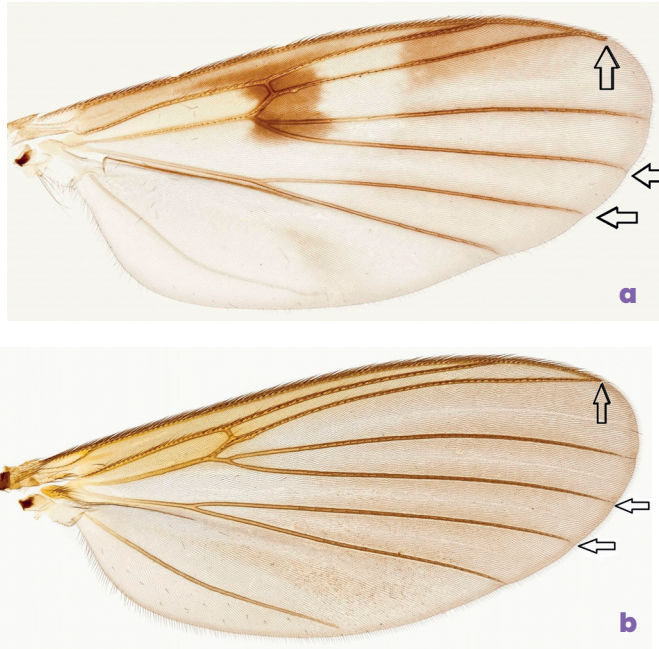


Figure 70. Wing of: (a) *Platurocypta testata*; (b) *Epicypta aterrima*.

Keys to species of Subfamily Mycetophilinae

Tribe Exechiini. Genus *Allodia* Winnertz

Small slender gnats with slender antennae and legs. Mesonotum dark dorsally, often paler on humeral area and side margins, abdomen dark with more or less developed yellow markings broader towards hind margins of tergites, legs yellow. Clypeus rather long ovate. Mesonotum with strong bristles only near margins. One pair of strong scutellars. 2 (–3) proepisternal bristles. Anepisternum bare. Wing with base of posterior fork below or before that of the median fork, usually level with or beyond base of stem of median fork. Fork veins bare. Crossveins r-m and bm-m bare. False vein behind CuA and CuP both weakly developed, false vein extending to about half length of posterior fork. Hind coxa with one posterobasal bristle. Hind tibia without posterior bristles. Wing length 2.0–3.5 mm.

Male genitalia with deep ventral excavation of gonocoxites, containing an elongate hypandrial lobe; tergite 9 usually with 2 pairs of longer bristles. Female cercus two-segmented.

There are few reliable characters other than in the male genitalia and only males can be determined.

There are 11 European species of which 10 are keyed by Zaitzev (2003), including 6 of the 7 British species (excepting *A. embla*).



Figure 71. (a) *Allodia lundstroemi* ♂, (b) *Allodia lugens* ♂.

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Figure 72. Ventral view of σ^7 genitalia of *Allodia*: (a) *lugens*; (b) *lundstroemi*; (c) *zaitzevi*; (d) *embla*; (e) *ornaticollis*; (f) *anglofennica*; (g) *truncata*.

Key to *Allodia* Winnertz

1. Sclerotised (dorsal) lobe of gonostylus (arrowed) narrowed and pointed apically
..... *lugens* (Wiedemann, 1817) (p. 97)
- Sclerotised lobe of gonostylus rounded or broadened apically 2
2. Basal lobe of gonostylus bearing an awl-shaped process (lower arrow in figures of *A. lundstroemi* and *A. zaitzevi*) 3
- Basal lobe of gonostylus without an awl-shaped process 6
3. Medial lobe of gonostylus blunt apically (upper arrow)
..... *lundstroemi* Edwards, 1921 (p. 97)
- Medial lobe of gonostylus produced or pointed apically (right arrow in figure of *A. embla*)
..... 4
4. Sclerotised lobe of gonostylus broad, more than half as wide as long in lateral view
(left arrow)..... *embla* Hackman 1971 (p. 97)
- Sclerotised lobe of gonostylus narrow, much longer than broad in lateral view 5

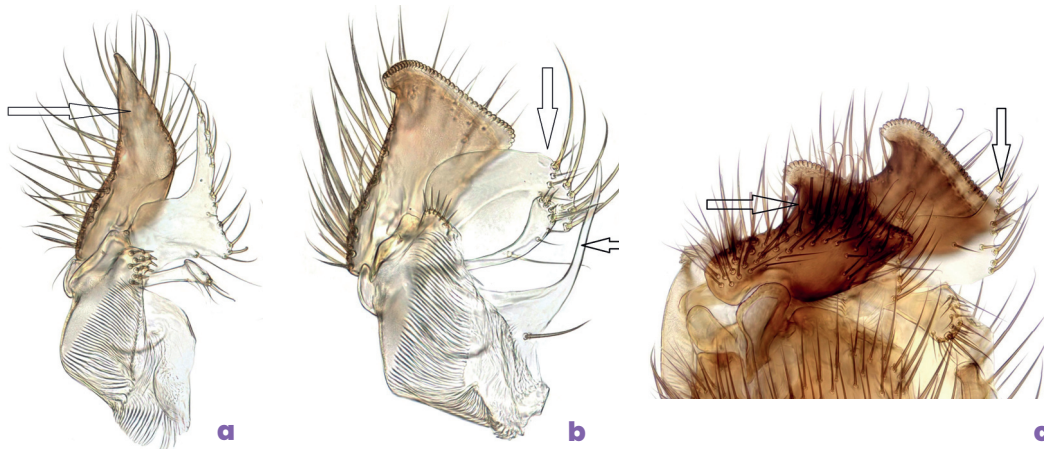


Figure 73. Internal view of right gonostylus of *Allodia*: (a) *lugens*; (b) *lundstroemi*. (c) Lateral view of gonostyli of *A. embla*.

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5. Sclerotised lobe of gonostylus with apical angles rounded (upper arrow) *zaitzevi* Kurina, 1998 (p. 98)
- Sclerotised lobe of gonostylus with apical angles pointed (arrowed) *ornaticollis* (Meigen, 1818) (p. 97)
6. Sclerotised lobe of gonostylus (arrowed) short, broad and bluntly rounded apically, shorter than medial lobe, which is tapered apically *truncata* Edwards, 1921 (p. 98)
- Sclerotised lobe of gonostylus broad with dorsal angle pointed (arrowed), a rounded edge ventrally and a little longer than the medial lobe, which is blunt apically *anglofennica* Edwards, 1921 (p. 96)

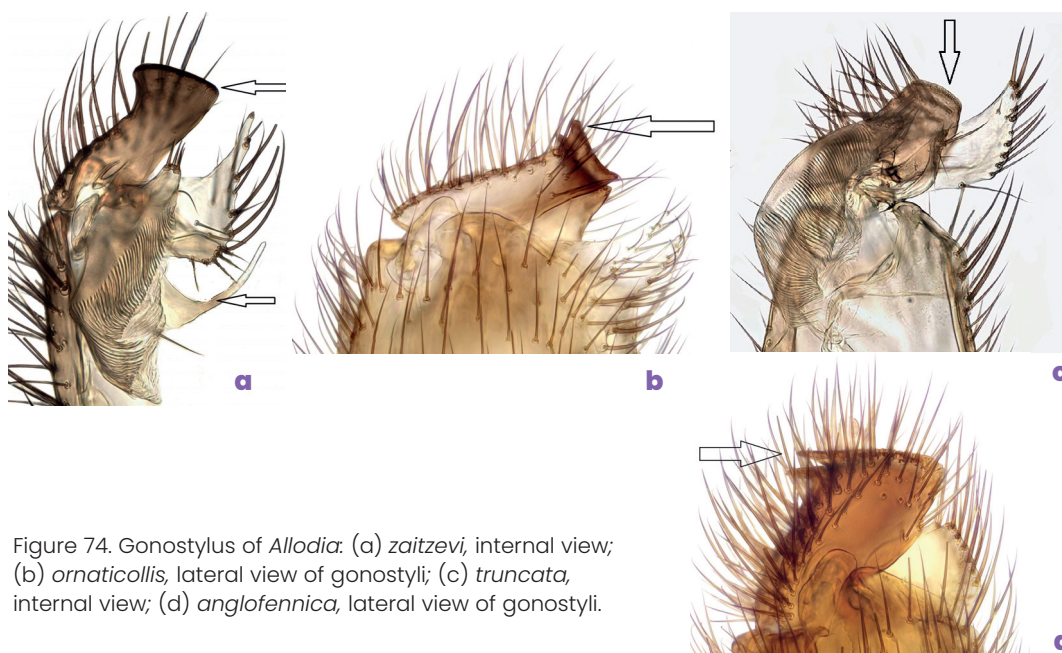


Figure 74. Gonostylus of *Allodia*: (a) *zaitzevi*, internal view; (b) *ornaticollis*, lateral view of gonostyli; (c) *truncata*, internal view; (d) *anglofennica*, lateral view of gonostyli.

Species notes

Allodia anglofennica Edwards, 1921

Distribution. A mainly northern species, commonest in the Scottish Highlands, with scattered records further south, in N England, N Wales and Shropshire, with an old record for Crowborough, Sussex. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Develops in terrestrial fungi, including *Peziza* and *Suillus* as well as several genera of agarics. **No British records. Other records:** *Rhodocollybia butyracea* (Plassmann 1971, Germany), *Conocybe aporos* (Ševčík 2006, 2010, Czech Republic), *Entoloma*, *Hebeloma mesophaeum*, *Inocybe lacera*, *Peziza*, *Suillus bovinus* (Jakovlev 1994, his rearings from Karelia), *Verpa bohemica* (Rimšaite 2000, Lithuania).

***Allodia embla* Hackman, 1971**

Distribution. Widespread, though with relatively few records, in the Scottish Highlands and a record from Cumbria, but most records are from the 1980s Welsh and East Anglian wetland surveys. Holarctic, originally described from Iceland but widespread in N Europe.

Habitat. Pine and birch woodland in Scotland, but English and Welsh records are mainly from wetlands, including mires and fens.

Biology. **No British records.** **Other records:** A Russian record from the terrestrial agaric *Inocybe lacera* (Jakovlev 1994, his rearing from Karelia), and *Laccaria laccata* in Estonia (Kurina 1994).

***Allodia lugens* (Wiedemann, 1817)**

Distribution. Very common throughout Britain, widespread in Ireland, also in Isle of Man and Guernsey. Holarctic, widespread in Europe.

Habitat. All types of woodland.

Biology. Polyphagous in terrestrial and saproxylic fungi, including agarics, boletes, cup fungi and the polypores *Meripilus* and *Albatrellus*. **British records:** *Armillaria mellea*, *Russula* sp. (Edwards 1925), *Hebeloma crustuliniforme*, *Sarcomyxa serotina* (Buxton 1960), *Chlorophyllum rhacodes*, *Meripilus giganteus*, *Mycena galericulata*, *Panaeolus papilionaceus*, *Psathyrella candolleana*, *P. microrhiza* (Chandler 1993b), *Lactarius turpis*, *Hygrophoropsis aurantiaca* (P. Chandler), *Cortinarius basiroseus* (J. Webb), *Laccaria laccata* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Amanita*, *Armillaria*, *Boletus*, *Calocybe*, *Flammulina velutipes*, *Galerina*, *Gomphidius*, *Gymnopilus*, *Inocybe*, *Hebeloma*, *Hygrophoropsis*, *Hygrophorus*, *Laccaria*, *Lactarius*, *Leccinum scabrum*, *Megacollybia*, *Melanoleuca*, *Mycena tintinnabulum*, *Paxillus*, *Russula*, *Stropharia*, *Suillus*, *Tricholoma*, *Tricholomopsis*, *Tubaria* (Barendrecht 1938, Dely-Draskovits 1974, Eisfelder 1955, Hackman and Meinander 1979, Ostroverkhova 1979, Plassmann 1971, Ribeiro 1990, Kurina 1994, Ševčík 2006 and 2010, Jakovlev 1994 and 2011), Pezizales (Russian record cited by Jakovlev 1994), *Albatrellus ovinus* (Hackman and Meinander 1979).

***Allodia lundstroemi* Edwards, 1921**

Distribution. Common throughout Britain and widespread in Ireland, also in Isle of Man. Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. **No British records.** **Other records:** the terrestrial agaric *Laccaria laccata* (Kurina 1991, Estonia), and the saproxylic *Neolentinus lepideus* (Jakovlev 1994, his rearing from Karelia).

***Allodia ornatcollis* (Meigen, 1818)**

Distribution. Very common throughout the British Isles, including Isle of Man and Jersey. Holarctic, widespread in Europe, also in the Atlantic islands.

Habitat. All types of woodland and wetland habitats.

Biology. Polyphagous in terrestrial and saproxylic agarics, also in boletes and cup fungi. **British records:** *Amanita vaginata*, *Agrocybe pediades*, *Rhodocollybia butyracea*, *Clitocybe*, *Collybia*, *Cortinarius*, *Crepidotus mollis*, *Cuphophyllus virgineus*, *Entoloma hirtipes*, *Hebeloma crustuliniforme*, *Hygrocybe coccinea*, *H. conica*, *Inocybe asterospora*,

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I. flocculosa, *I. geophylla*, *I. griseolilacina*, *Inosperma cookei*, *Laccaria laccata*, *Melanoleuca melaleuca*, *Mucidula mucida*, *Panaeolus papilionaceus*, *Pluteus cervinus*, *Psathyrella piluliformis*, *Pseudosperma rimosum*, *Russula adusta*, *R. emetica*, *R. fragilis*, *R. nitida*, *R. pectinata*, *Suillus granulatus*, *Tricholomella constricta*, *Xerocomus subtomentosus* (Buxton 1960, Chandler 1993b, Edwards 1925, Fortey and Chandler 2021; P. Chandler, J. Bowden, J. Webb). **Other records:** *Agaricus*, *Agrocybe*, *Armillaria*, *Boletus*, *Conocybe*, *Cortinarius*, *Crepidotus*, *Entoloma*, *Hypholoma*, *Inocybe*, *Kuehneromyces*, *Lactarius*, *Leccinum*, *Lepiota*, *Marasmius*, *Megacollybia platyphylla*, *Mycena*, *Panaeolus*, *Paxillus*, *Pholiota*, *Pluteus*, *Psathyrella*, *Russula*, *Tricholoma terreum* (Canzanelli 1941, Dely-Draskovits 1974, Eisfelder 1955, Falcoz 1926, Hackman and Meinander 1979, Kurina 1994, Kurina 1998, Plassmann 1971, Ribeiro 1990, Jakovlev 1994, Ševčík 2006 and 2010); *Morchella esculenta*, *Gyromitra esculenta* and Pezizales (Russian records cited by Jakovlev 1994).

***Allodia truncata* Edwards, 1921**

Distribution. Common throughout Britain, widespread in Ireland, also in Isle of Man. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Rearing records are from terrestrial agarics. **British records:** *Inocybe lacera* (Chandler 1993b). **Other records:** *Gymnopus androsaceus* (Plassmann 1971, Germany)

***Allodia zaitzevi* Kurina, 1998**

Distribution. Common throughout Britain, widespread in Ireland, also in Isle of Man. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Rearing records are from several genera of terrestrial and saproxylic agarics; some foreign records attributed to *A. pyxidiiformis* may refer to this species. **British records:** *Russula ochroleuca* (J. Webb; Chandler 2010b), *R. adusta* (P. Chandler). **Other records:** *Amanita citrina*, *A. muscaria*, *A. porphyria*, *Boletus edulis*, *Gomphidius glutinosus*, *Russula flava*, *R. fragilis*, *R. paludosa*, *R. velenovskyi*, *R. vinosa*, *Suillus bovinus* (Kurina 1998), *Rhodocollybia butyracea*, *Conocybe aporos*, *Cortinarius cumatilis*, *Russula* sp. (Ševčík 2006, 2010), *Pluteus cervinus* (Jakovlev 2011). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Genus *Allodiopsis* Tuomikoski

Slender but robust-bodied gnats with slender antennae and long legs. Mesonotum dark centrally, paler towards side margins, abdomen with pale markings broadest along hind margins of tergites, legs yellow. Clypeus higher than broad, more or less ovate. Mesonotum clothed with pale setulae and with black bristles dorsally in dorsocentral rows. Anepisternum bare. Two pairs of strong scutellar bristles and 3 or 4 proepisternal bristles. Wing with base of posterior fork well before or sometimes opposite base of stem of the median fork. Fork veins setulose only near tips, on less sclerotised apical portion. False vein weak but extending to about middle of posterior fork. CuP strong and reaching

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beyond level of base of posterior fork, r-m with some setulae close to junction with R, bm-m bare. Hind coxa with a single dark posterobasal bristle, setulae in a row below it minute and pale. Hind tibia with a row of posterior bristles in apical quarter. Hind tibial spurs half or more as long as tarsomere 1. Wing length 3.5–4.5 mm.

Male genitalia large with a shallow ventral excavation of the gonocoxites, enclosing a small hypandrial lobe. Tergite 9 with two pairs of long bristles. Female cercus two-segmented; tergite 7 distinctly longer than corresponding sternite.

There are 6 European species, of which 4 including the 3 British species are among the 5 species keyed by Zaitzev (2003). As only two male specimens of *A. korolevi* have been found in Britain its status and female characters are unclear. Otherwise it is possible to recognise females of the two widespread British species by the femoral character.



a



b

Figure 75. *Allodiopsis rustica*: (a) ♂; (b) head and thorax.

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Key to *Allodiopsis* Tuomikoski

1. Hind femur with a dark patch beneath near base. Sclerotised ventral lobe of gonostylus strongly curved medially without short bristles on internal face (upper arrow). Medial sclerotised part of hypandrial lobe blunt ended (lower arrow) *rustica* (Edwards, 1941) (p. 101)
- Hind femur without dark patch beneath near base. Sclerotised ventral lobe of gonostylus less strongly curved medially and with short bristles on internal face (upper arrow for *A. domestica*). Medial sclerotised part of hypandrial lobe tapered (lower arrow for *A. domestica*) 2
2. Ventral lobe of gonostylus almost straight, narrowed apically (arrowed) *korolevi* Zaitzev, 1982 (p. 101)
- Ventral lobe of gonostylus curved and slightly enlarged apically *domestica* (Meigen, 1830) (p. 101)

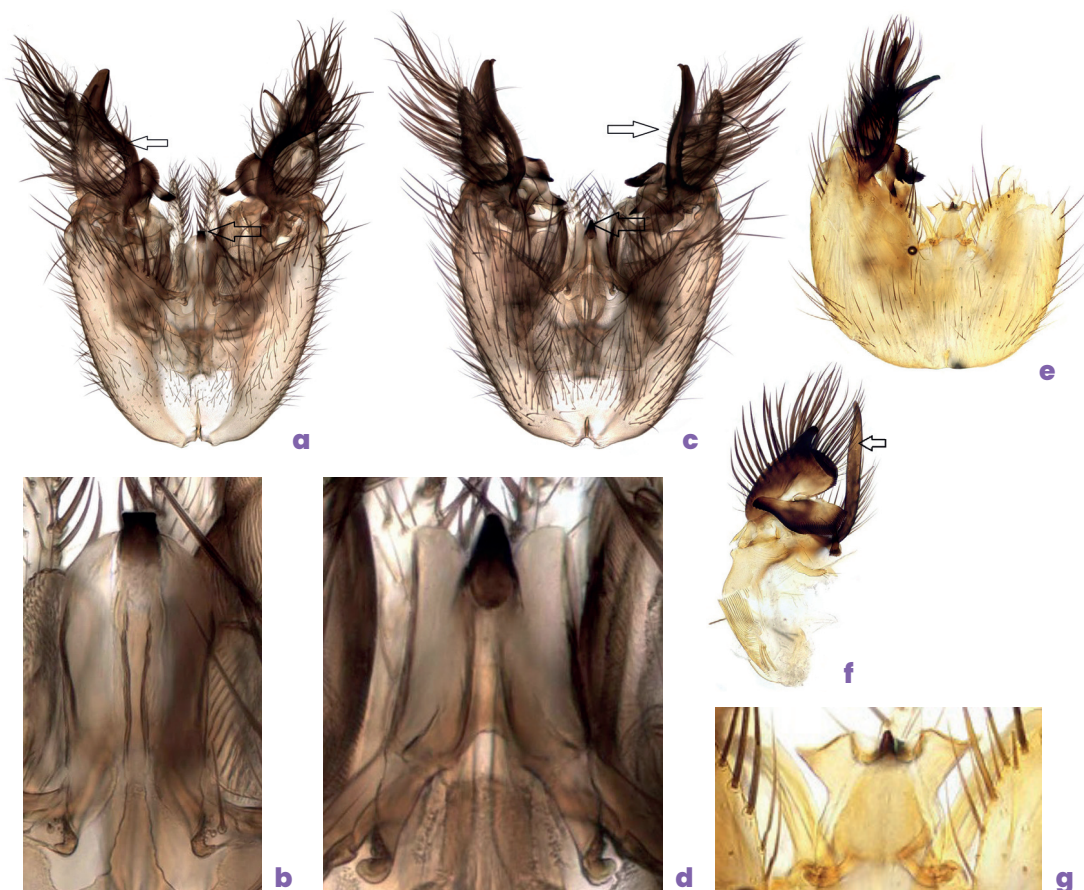


Figure 76. *Allodiopsis rustica*: (a) ventral view ♂ genitalia and (b) hypandrial lobe.

Allodiopsis domestica: (c) ventral view of ♂ genitalia and (d) hypandrial lobe.

Allodiopsis korolevi: (e) ventral view of ♂ genitalia; (f) internal view of gonostylus; (g) hypandrial lobe.

Species notes

Allodiopsis domestica (Meigen, 1830)

Distribution. Frequent but local throughout Britain, though only recorded from the eastern parts of Wales; distinctly less common than the similar species *A. rustica*. One Irish record (Moy, Co Tyrone, 1984), also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Develops in several genera of large terrestrial agarics. **British records:** *Calocybe gambosa*, *Clitocybe odora*, *Infundibulicybe geotropa*, *Marasmius oreades* (Buxton 1960, Chandler 1993b), *Clitocybe rivulosa*, *Lepista nuda* (J. Webb). The records by Edwards (1925) and Madwar (1937) from *Lepista nuda*, *Infundibulicybe gibba* and *Marasmius oreades* preceded recognition of *A. rustica* as a distinct species. **Other records:** *Amanita muscaria*, *Ampulloclitocybe clavipes*, *Aspropaxillus giganteus*, *Atractosporocybe inornata*, *Clitocybe costata*, *C. phaeophthalma*, *C. nebularis*, *C. squamulosa*, *Infundibulicybe gibba*, *Rhodocollybia butyracea*, *Cortinarius armillatus*, *Cystoderma amianthinum*, *Echinoderma asperum*, *Entoloma* sp., *Hebeloma* sp., *Hygrophorus*, *Lactarius* sp., *Lepiota clypeolaria*, *Lepista glaucocana*, *L. nuda*, *L. sordida*, *Leucocortinarius bulbiger*, *Lyophyllum decastes*, *Marasmius oreades*, *Melanoleuca brevipes*, *Omphalotus*, *Paralepista flaccida*, *Phaeolepiota aurea* (Dely-Draskovits 1974, Eisfelder 1955, Falcoz 1924 and 1926, Hackman and Meinander 1979, Landrock 1927, Kurina 1994, Rimšaite 2000, Ševčík 2010 and Russian records cited by Jakovlev 1994).

Allodiopsis korolevi Zaitzev, 1982

Note. The Spring Wood specimen agrees with Zaitzev's figure in the hypandrial lobe, while the Crickley Hill specimen figured here shows some differences.

Distribution. Only known in Britain from two males found at Spring Wood, Boltby, Yorks (17.vii.1996, A. Stubbs) and Crickley Hill, Gloucs (vii-ix.2019, K. Alexander). It is unclear if this is a rare native or a recent arrival in this country. Palaearctic, widespread but rare in Europe.

Habitat. A small partly coniferised woodland in Yorkshire, dry woodland on limestone in Gloucs.

Biology. Unknown.

Allodiopsis rustica (Edwards, 1941)

Distribution. Very common throughout Britain and Ireland, also in Isle of Man. Holarctic, widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. Develops in several genera of large terrestrial agarics. **British records:** *Lepista nuda* (Buxton 1960), *Infundibulicybe geotropa* (J. Webb), *Clitocybe nebularis* (J. Bowden, J. Webb, R. Fortey; Fortey and Chandler 2021), *Clitocybe vibecina* (P. Chandler), *Hygrophoropsis aurantiaca* (Chandler 1993b, J. Webb), *Hypholoma fasciculare*, *Laccaria laccata*, *Macrolepiota excoriata*, *M. procera* (J. Bowden). **Other records:** *Ampulloclitocybe clavipes*, *Clitocybe dicolor*, *C. odora*, *Russula atropurpurea* (Kurina 1991, Matile 1971, Plassmann 1971, Ribeiro 1990), *Leucocybe connata*, *Tricholoma album* (Russian records cited by Jakovlev 1994), *Rhodocollybia butyracea*, *Clitocybe nebularis*, *Lepista nuda*, *Limacellopsis guttata*, *Paralepista flaccida* (Ševčík 2006, 2010).

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Genus *Anatella* Winnertz

Small, mainly dark-bodied gnats with yellow legs. Antennae and palpi slender. Clypeus ovate. Mesonotum with dorsocentral series and other scattered bristles. Anepisternum bare. One pair of strong scutellars, 1-2 proepisternals. Costa distinctly produced well beyond tip of vein R_{4+5} . Crossvein r-m and stem of median fork subequal. Base of posterior fork just before to just beyond level of base of median fork. Fork veins may be setulose or bare. Hind coxa with posterobasal bristle weak or absent. Hind tibia with short weak posterior bristles near tip. Wing length 2-3 mm.

Male genitalia ventrally with broad lateral lobes of the gonocoxites on either side of a median hypandrial lobe. Gonostylus with distinct dorsal and ventral lobes, the ventral lobe usually more slender and often with one or more apical bristles or spines. Female cercus with apical segment very small or not differentiated.

There are 27 European species, of which 15 are known from Britain. Of the latter 11 are included among the 25 species keyed by Zaitzev (2003). His key separates the following species as bearing a row of fine bristles on the inner side of the mid tibia: *turi*, *setigera*, *ciliata*, *flavomaculata*.

Females of this genus are poorly known and have not been distinguished for most species. The key is therefore based only on males. Coloration is variable and is summarised within square brackets in key couplets.



Figure 77. (a) *Anatella longisetosa* ♂. (b) *Anatella setigera* ♂.

Key to *Anatella* Winnertz

1. Mid femur with posteroventral fringe of bristles well developed, distinctly longer and stronger than anteroventral fringe, with some bristles more than half median femoral depth (upper arrow in figure of *A. ciliata*) 2

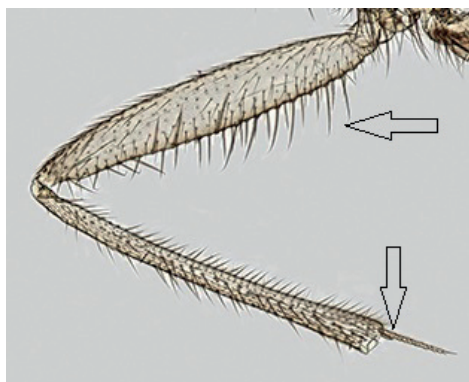


Figure 78. *Anatella ciliata* posterior view of mid femur and tibia.

- Mid femur with weak fringes, the posteroventral fringe never better developed than the anteroventral fringe, although some bristles in the latter may be half median femoral depth 4
2. Mid femur with a strong fringe, with the bristles longest towards the base where they are around as long as the median femoral depth (upper arrow). Mid tibia with outer (anterior) spur very short (lower arrow), not more than one quarter length of inner spur. Gonostylus with a cluster of short bristles internally near apex of dorsal lobe (lower arrow); ventral lobe with a strong spinose apical bristle (upper arrow). Hind coxa without posterobasal bristle. [Thorax grey pruinose; tergites 1-2 sometimes slightly paler. First flagellomere yellow basally] *ciliata* Winnertz, 1864 (p. 111)

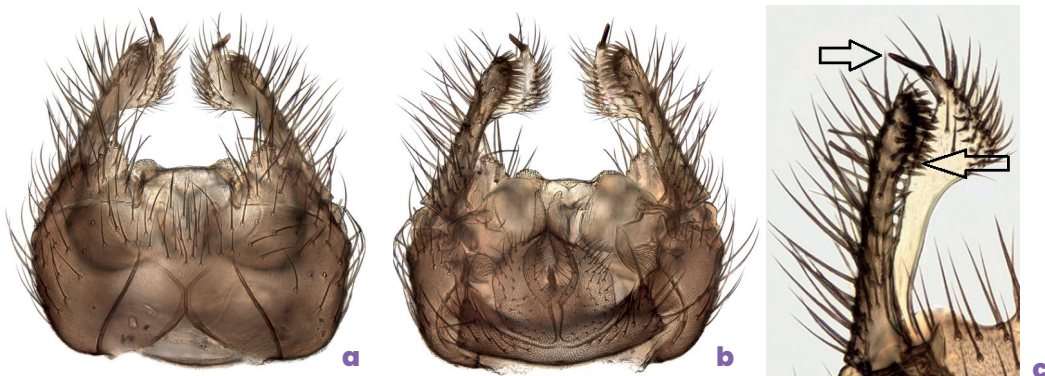


Figure 79. *Anatella ciliata*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) gonostylus.

- Mid femur with fringe weaker, scarcely exceeding half depth of femur. Mid tibia with outer spur at least half length of inner spur. Hind coxa with posterobasal bristle present 3

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3. Gonostylus with ventral lobe without a strong dorso-apical bristle, but with several longer bristles apically (right arrow); dorsal lobe with bristles longer than its shaft along most of its length (left arrow). Mid femur with fringe longer on basal half. Hind coxa with a well-developed posterobasal bristle. [Body blackish grey. Flagellum entirely grey] *longisetosa* Dziedzicki, 1923 (p. 112)
- Gonostylus with ventral lobe bearing a strong dorso-apical bristle (upper arrow); dorsal lobe (lower arrow) with long bristles restricted to basal half. Mid femur with fringe longest apically but not quite half femoral depth. Hind coxa with posterobasal bristle small and weak. [Body grey pruinose. First flagellomere yellow basally]
..... *setigera* Edwards, 1921 (p. 113)

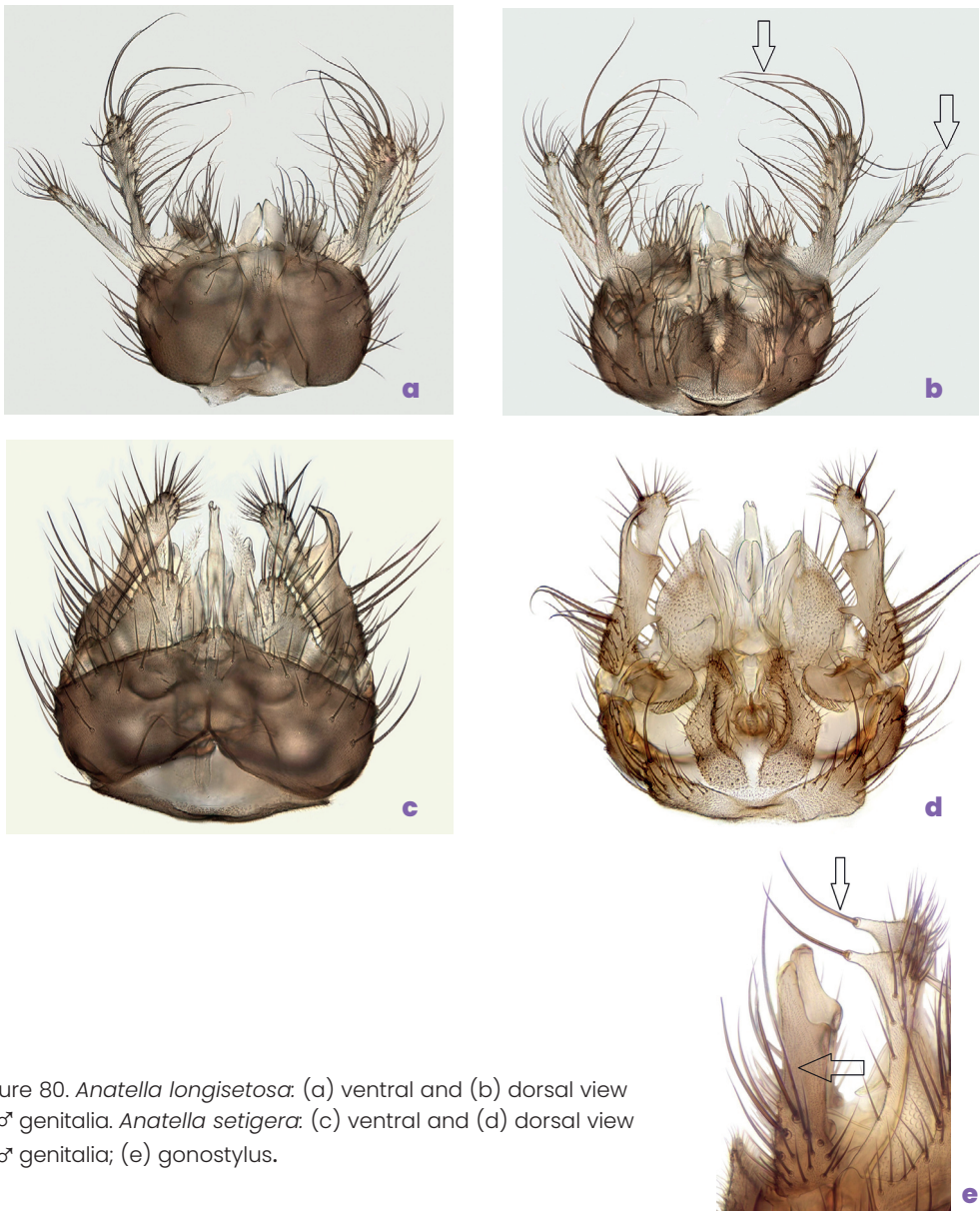
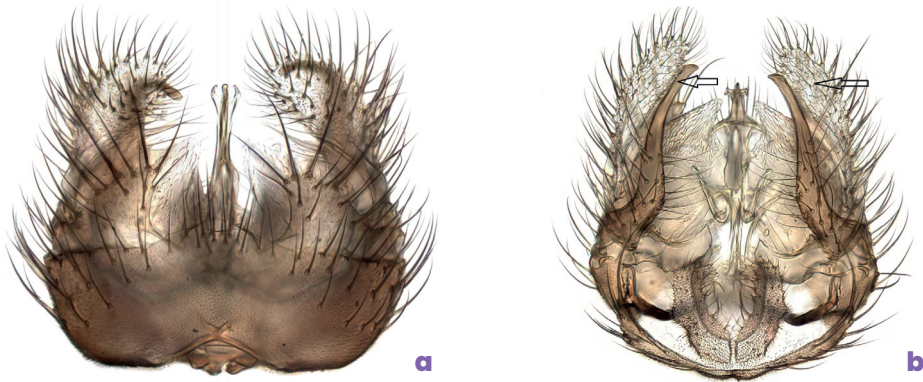


Figure 80. *Anatella longisetosa*: (a) ventral and (b) dorsal view of ♂ genitalia. *Anatella setigera*: (c) ventral and (d) dorsal view of ♂ genitalia; (e) gonostylus.

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4. Mid tibia with outer spur absent but inner spur of normal strength. Gonostylus with dorsal lobe curved with sparse bristling, bare and slender apically (left arrow); ventral lobe broad and densely bristled (right arrow). Hind coxa without posterobasal bristle. [Thorax grey pruinose; tergites 1-3 yellow laterally. Basal one or two flagellomeres yellow] *turi* Dziedzicki, 1923 (p. 113)
- Mid tibia with outer spur always present, although almost invariably shorter than inner spur, never less than half as long 5

Figure 81. *Anatella turi*: (a) ventral and (b) dorsal view of ♂ genitalia.

5. Hind coxa without a posterobasal bristle. Gonostylus with narrow bristly ventral lobe (upper arrow); dorsal lobe broad with a slender curved bare internal process medially (lower arrow). Wing veins yellow. [Body dark grey; thorax blackish dorsally. Basal antennal segments and palpus dark] *unguigera* Edwards, 1921 (p. 113)
- Hind coxa with posterobasal bristle usually well-developed, always present. Wing veins grey, but with fork veins as usual paler than radial sector 6

Figure 82. *Anatella unguigera*: (a) ventral view of ♂ genitalia and (b) gonostylus.

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6. Gonostylus with dorsal lobe rounded with long bristles apically, without a bare process near apical margin but a long sinuous process extending internally from its base dorsally, bare except for some short spinose bristles apically (lower arrow); ventral lobe club-shaped, slender and bare basally, broader and bristly on apical half (upper arrow). [Mesonotum uniformly sooty black. Tergites 1-3 usually broadly yellowish at sides, but this coloration sometimes obscured or reduced in extent. Antenna and palpus grey; base of first flagellomere brownish] *flavomaculata* Edwards, 1925 (p. 112)
- Gonostylus with dorsal lobe bare apically or with a bare process or flange extending from its apical margin 7



Figure 83. *Anatella flavomaculata*: (a) ventral view of ♂ genitalia and (b) gonostylus.

7. Gonostylus with bare apical part of dorsal lobe not a separate process or flange. [Mesonotum deep black dorsally, broadly grey dusted on humeral areas and more narrowly on sides] 8
- Gonostylus with dorsal lobe bearing one or two discrete bare apical processes 9
8. Gonostylus with dorsal lobe broad basally, tapered and bare on apical half (upper arrow); ventral lobe about half length of dorsal lobe, slender with short bristles apically (lower arrow). [Basal antennal segments (scape and pedicel) obscurely yellowish and palpus yellow. Mesonotum with grey dusting lighter and more strongly contrasted than in *A. alpina*] *ankeli* Plassmann, 1977 (p. 111)
- Gonostylus with dorsal lobe narrow, with bare tapered apical portion short (left arrow); ventral lobe slender and bare except for two bristles (apical and subapical) (right arrow). [Antenna and palpus entirely blackish. Mesonotum less well contrasted than in *A. ankeli*] *alpina* Plassmann, 1977 (p. 111)

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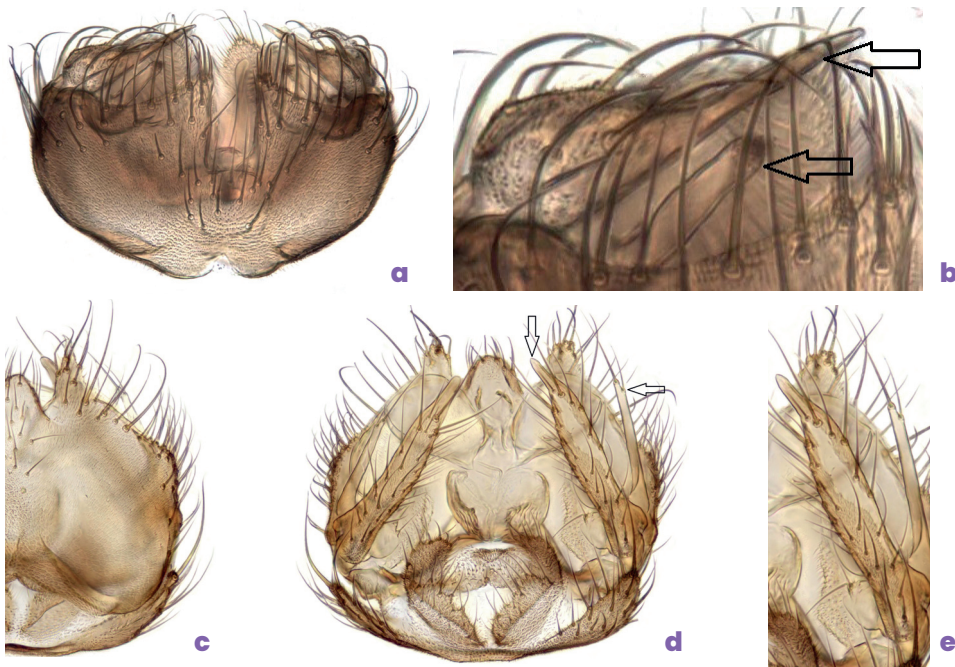


Figure 84. *Anatella ankeli*: (a) ventral view of σ^7 genitalia; (b) gonostylus. *Anatella alpina*: (c) ventral and (d) dorsal view of σ^7 genitalia; (e) gonostylus.

9. Gonostylus with broad bristly dorsal lobe with two bare apical processes (both arrowed in dorsal view of gonostylus), so appearing deeply bilobed; ventral lobe narrow with a group of short bristles apically and one long erect bristle on a subapical protuberance (arrowed in ventral view of gonostylus). [Mesonotum and abdomen grey pruinose] *pseudogibba* Plassmann, 1977 (p. 113)
- Gonostylus with dorsal lobe bearing a single bare apical process or flange 10

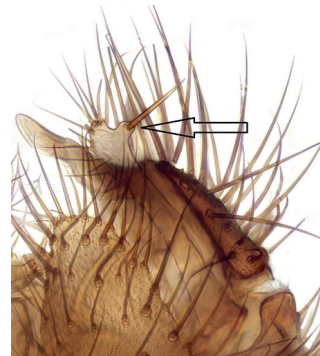
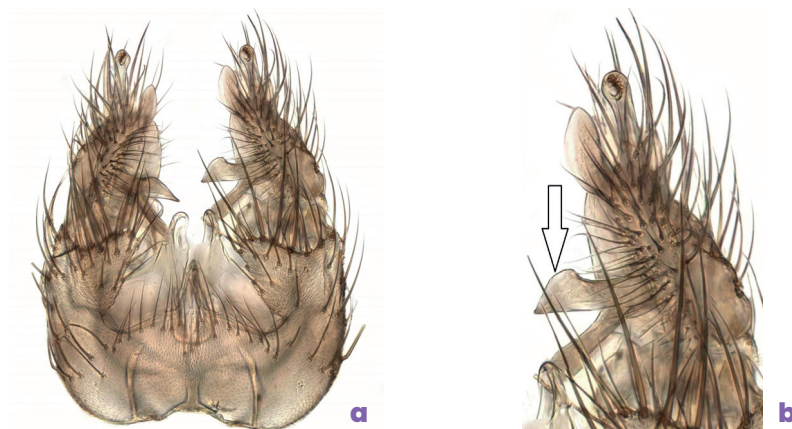


Figure 85. *Anatella pseudogibba*: (a) ventral and (b) dorsal view of σ^7 genitalia; (c) ventral and (d) dorsal view of gonostylus.

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10. Gonostylus with dorsal lobe bearing a broadly forked flat bare internal process medially (arrowed in view of gonostylus); ventral lobe narrow basally, curved on apical part, with a group of short bristles at tip. [Mainly dark with tergites 2-4 paler laterally towards hind margin; genitalia brownish yellow] *simpatica* Dziedzicki, 1923 (p. 113)
- Gonostylus with dorsal lobe without such a process 11

Figure 86. *Anatella simpatica*: (a) ventral view of ♂ genitalia and (b) gonostylus.

11. Gonostylus with bare process of dorsal lobe a broad flange from its internal surface (its apex right arrow in view of gonostylus); ventral lobe bent medially and tapered apically (left arrow). [Mesonotum all dark or dull orange brown with three darker stripes; tergites 2-4 paler laterally; genitalia yellowish] *lenis* Dziedzicki, 1923 (p. 112)
- Gonostylus with bare process of dorsal lobe narrow and set on its apical margin 12

Figure 87. *Anatella lenis*: (a) ventral view of ♂ genitalia and (b) gonostylus.

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12. Gonostylus with ventral lobe tapered apically; dorsal lobe with bare process shorter than broad basal part (lower arrow in gonostylus figures of *A. brexia* and *A. dampfi*) 13
- Gonostylus with ventral lobe rounded apically; dorsal lobe with bare process slender and about as long as broad basal part (right arrow in gonostylus figures of *A. emergens* and *A. minuta*) 14
13. Gonostylus with ventral lobe broad basally, tapered apically with one short terminal bristle (upper arrow). [Mesonotum greyish brown, darker dorsally; sides of tergites 1-4 obscurely yellowish] *brexia* Chandler, 1994 (p. 111)
- Gonostylus with ventral lobe bristly except for narrow apical process, which is bare except for a group of very short bristles apically (upper arrow). [Mesonotum uniformly sooty black] *dampfi* Landrock, 1924 (p. 111)

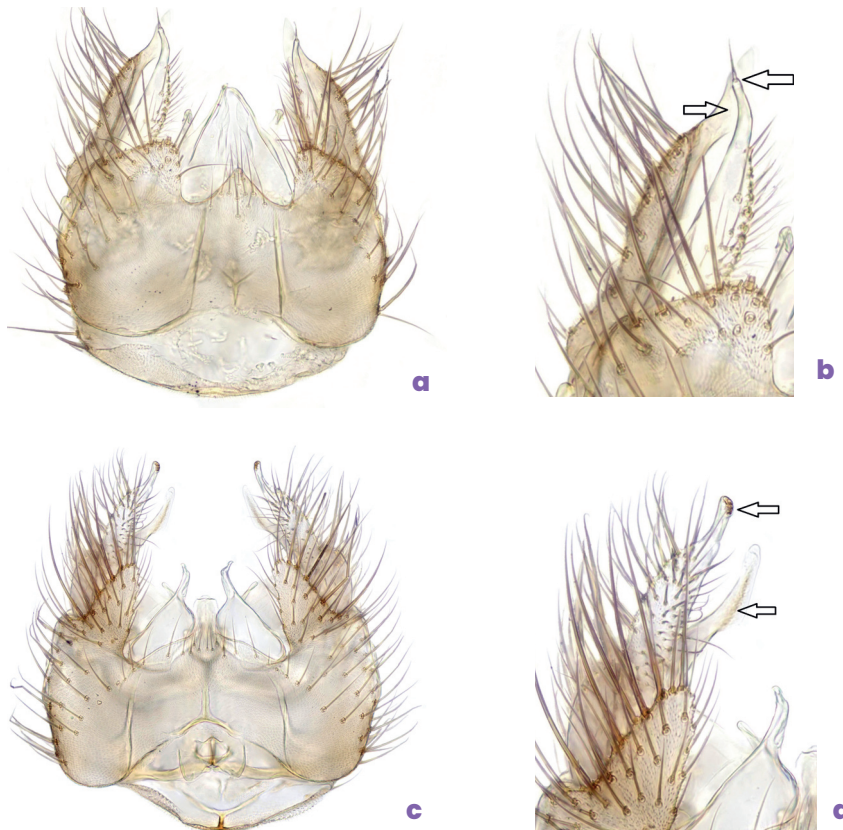


Figure 88. *Anatella brexia*: (a) ventral view of ♂ genitalia and (b) gonostylus. *Anatella dampfi*: (c) ventral view of ♂ genitalia and (d) gonostylus.

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14. Gonostylus with a broad ventral lobe, apically rounded with dense short bristling covering its dorsal surface; dorsal lobe with a pointed outer corner (left arrow) to the basal bristly part. [Mesonotum uniformly sooty black. Abdomen entirely dark or with tergites 1-4 yellow at sides, broadest on 3. Antenna mainly dark, pedicel and base of first flagellomere often yellowish; palpus brown to yellowish] *emergens* Caspers, 1987 (p. 112)
- Gonostylus with ventral lobe narrow basally, broadly rounded apically, bare except for a group of long bristles apically and a dorsal subapical patch of short dense bristling (left arrow); dorsal lobe with a rounded outer corner to the basal bristly part. [Coloration variable: mesonotum often all dark grey brown, but usually paler laterally (so may have coloration described for *A. lenis*); tergites 2-3 sometimes pale at sides] *minuta* (Staeger, 1840) (p. 112)

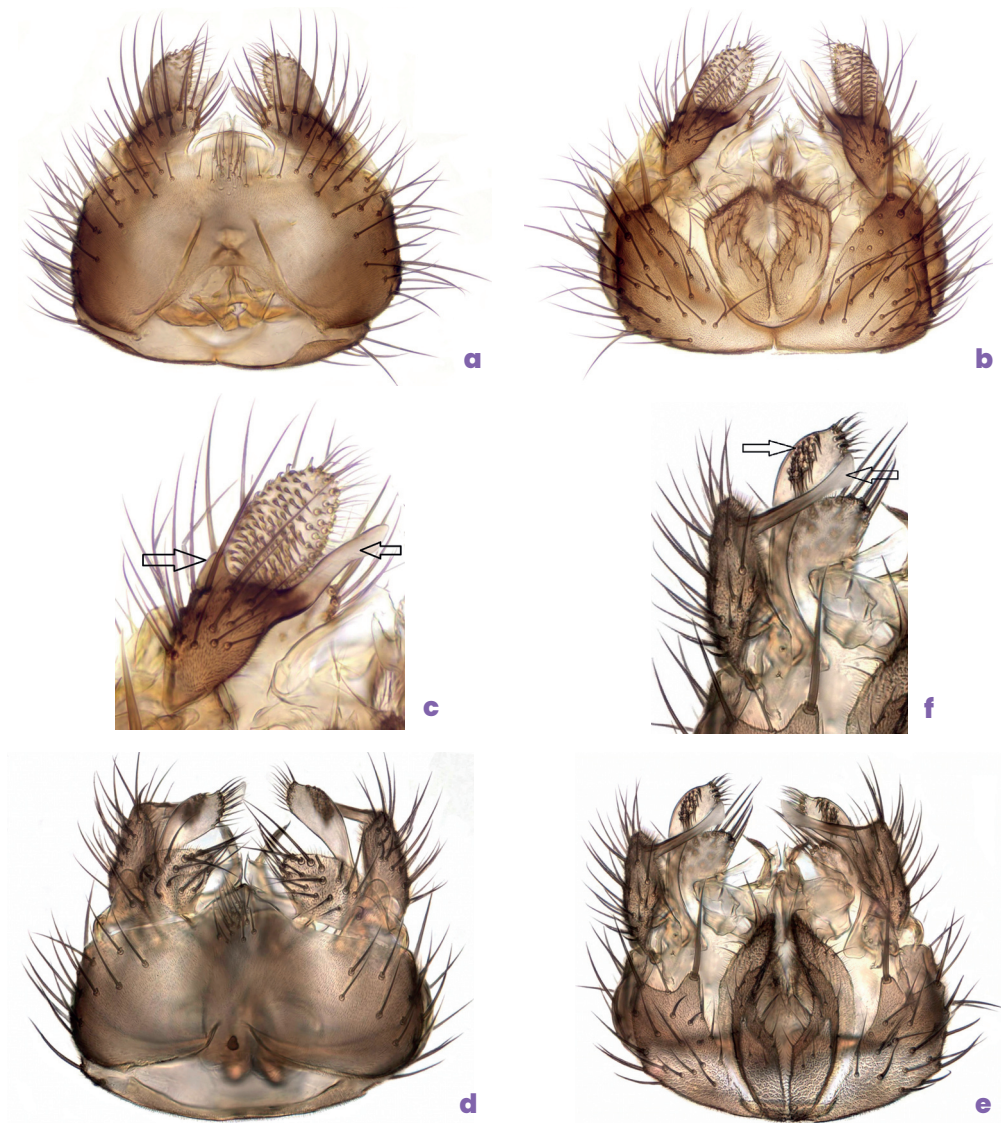


Figure 89. *Anetella emergens*: (a) ventral and (b) dorsal view of σ genitalia; (c) gonostylus. *Anetella minuta*: (d) ventral and (e) dorsal view of σ genitalia; (f) gonostylus.

Species notes

Anatella alpina Plassmann, 1977

Distribution. Apparently very localised with a few records scattered widely in the north and west of Britain: Pass of Killiecrankie (1.ix.1987); Ivybridge, Devon (11.x.1980); two Welsh sites (Aber Valley, 7.vii.1987; Cors Caranod, 23.vii.1987). The most recent record is Little Don Valley, Yorkshire (5.x.2005, J. Coldwell). One Irish record (Glendalough, 10.xi.1986). Scarce in C and N Europe.

Habitat. Most British sites are deep gorges in broad-leaved woodland, but Cors Caranod is an *Equisetum* fen.

Biology. Unknown.

Anatella ankeli Plassmann, 1977

Distribution. Very localised, with the few British records scattered widely in the north and west: Scotsburn Gulley, Ross (18.vi.1976); Nethy Bridge, Spey valley (3.ix.2011); Cogley Wood, Somerset (19.x.1986); Bewley Wood and Down, and Radish Plantation, Somerset (2015–2017); two sites in S Wales (Penrice and Nicholaston Wood, both 9.vii.2009). Three Irish records from Riverstick, Co Cork (vii.1994, P. Withers), Enniskerry, Co Wicklow (10.xi.1986, Chandler) and St John's Wood, Co Roscommon (in two hectads, 8.x.2010, K. Alexander). Widespread in Europe.

Habitat. Its sites in Britain and Ireland include wooded gorges and ancient woodland.

Biology. Unknown.

Anatella bremia Chandler, 1994

Distribution. Most British records are from the 1980s Welsh wetland surveys, when it was numerous at some of the 13 sites recorded in 1987–1989. There are also two Scottish records: an older museum specimen from the Isle of Arran (19.iv.1953, W.D. Hincks) and a more recent one from the Spey bank, Nethy Bridge (13.ix.2013, Chandler). Widespread in Europe.

Habitat. Recorded from a wide range of wetland sites, including water meadows, floodplain fens as well as the floating fen at Llyn Hafodol, also from eroded peat hags and a *Molinia* bog.

Biology. Unknown.

Anatella ciliata Winnertz, 1864

Distribution. Frequent throughout Britain; widespread in Ireland. Holarctic, widespread in Europe.

Habitat. Wet woodland.

Biology. Unknown, but obtained in an emergence trap over dead wood (Jakovlev 2011).

Anatella dampfi Landrock, 1924

Distribution. Evidently widespread in Britain, with some records from the Pennines and Scottish borders. However, most records are from the 1980s wetland surveys in Wales,

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Oxfordshire and East Anglia, when it was found in great numbers at many sites. Recent records are from S Wales (Wentlooge Levels, 2011, D. Gibbs), Norfolk (Winterton dunes, 2016, A. Irwin) and Devon (Dartington Hall, 2017, M. Luff). One Irish record (Lough Neagh, N Ireland, viii.2016; Chandler *et al.* 2017). Holarctic, widespread in Europe.

Habitat. Earlier British records were from upland woods and moorland, but in the wetland surveys of the 1980s it was found in a wide range of wetland habitats.

Biology. Unknown.

***Anatella emergens* Caspers, 1987**

Distribution. This species may have been earlier confused with *A. minuta* and is probably under-recorded. Records are widely scattered throughout Britain, with most in East Anglia and the Scottish Highlands; a record from Windsor Forest, Berks (5.vi.1989) is the most southerly. One Irish record (Louisburgh, Co Mayo, 14.vi.1985, Chandler). Palearctic, widespread in Europe.

Habitat. Woodland and wetlands.

Biology. Unknown.

***Anatella flavomaculata* Edwards, 1925**

Distribution. Common throughout Britain, north to Inverness; two Irish records (Derrybawn, Co Wicklow, 1980; Nuremore Lake, Co Monaghan, 1977). Holarctic, widespread in Europe.

Habitat. Wet woodland.

Biology. **British records:** reared from the saproxylic fungus *Cudoniella acicularis* (Chandler 1977b, 1993b). **Other records:** a Russian record cited by Jakovlev (1994) from the terrestrial agaric *Amanita muscaria* is doubtful.

***Anatella lenis* Dziedzicki, 1923**

Distribution. Frequent throughout Britain, especially in the south, and widespread in Ireland. Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. **No British records.** **Other records:** from the saproxylic fungi *Ascocoryne sarcoides* (Ševčík 2006, Czech Republic) and *Exidia glandulosa* (Plassmann 1971). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Anatella longisetosa* Dziedzicki, 1923**

Distribution. Frequent throughout Britain. One Irish record (Virginia, Co Cavan, 20.iii.1988, J. O'Connor). Widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Anatella minuta* (Staeger, 1840)**

Distribution. Frequent throughout Britain, but no Irish records. Holarctic, widespread in Europe.

Habitat. Woodland and wetlands.

Biology. Unknown. Russian records cited by Jakovlev (1994) from the agaric genera *Amanita*, *Lactarius*, *Paxillus*, *Pholiota* and *Russula* require confirmation.

***Anatella pseudogibba* Plassmann, 1977**

Distribution. British records are from the central Scottish Highlands, where it has been found at two sites in the Spey valley (Kinrara, 23.vi.1967, D.M. Ackland; Granttown, 19.vi.1982, 24.x.1993, Chandler) and at Ben Lawers (10.ix.2014, I. Perry), and one record from Devon (Scadsbury, by River Lew, Malaise trap, vii-xi.2016, R. Wolton). Widespread in Europe.

Habitat. The Granttown site is open pine woodland, while that at Kinrara could have been riverside fen or broad-leaved woodland. At Ben Lawers it was in developing birch wood on montane grassland.

Biology. Unknown.

***Anatella setigera* Edwards, 1921**

Distribution. Frequent throughout Britain, widespread in Ireland. It was especially numerous in the 1980s wetland surveys in Wales and East Anglia. Holarctic, widespread in Europe.

Habitat. Woodland and wetlands.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Anatella simpatica* Dziedzicki, 1923**

Distribution. Common throughout Britain and widespread in Ireland, also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland and wetlands.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Anatella turi* Dziedzicki, 1923**

Distribution. Frequent throughout Britain, especially in S England and in the Scottish Highlands. Two Irish records (Lough Key, Co Roscommon; Glendalough, Co Wicklow, 1986). Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Anatella unguigera* Edwards, 1921**

Distribution. Common throughout Britain, widespread in Ireland. It was numerous in the 1980s wetland surveys in Wales and East Anglia. Palaearctic, widespread in Europe.

Habitat. Woodland and wetlands, including carr, fens and bogs.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland

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Genus *Brachycampta* Winnertz

Small slender gnats with slender antennae and legs. Mesonotum dark dorsally, often paler on humeral area and side margins, abdomen dark with more or less developed yellow markings broader towards bases of tergites, legs yellow. Clypeus rather long ovate. Mesonotum with distinct bristles in two dorsocentral series extending almost to front margin. One pair of strong scutellars. 2 (–3) proepisternal bristles. Anepisternum bare. Wing with base of posterior fork usually well before or below base of stem of median fork. Fork veins bare. Crossveins r-m and bm-m bare. False vein behind CuA and CuP both weakly developed, false vein extending to about half length of posterior fork. Hind coxa with one posterobasal bristle. Hind tibia without posterior bristles. Wing length 2.0–3.5 mm.

Male genitalia with deep ventral excavation of gonocoxites, containing an elongate hypandrial lobe; tergite 9 usually with a single very long bristle (arrowed in dorsal view of *B. barbata*) on each side. Female cercus two-segmented.

There are few reliable characters other than in the male genitalia and only males can be determined.

There are 22 European species of which 15, including all of the 11 British species, are keyed by Zaitzev (2003).

Key to *Brachycampta* Winnertz

1. Gonocoxites with dense bristling on apical margin *barbata* Lundström, 1909 (p. 119)
- Gonocoxites without dense bristling apically 2

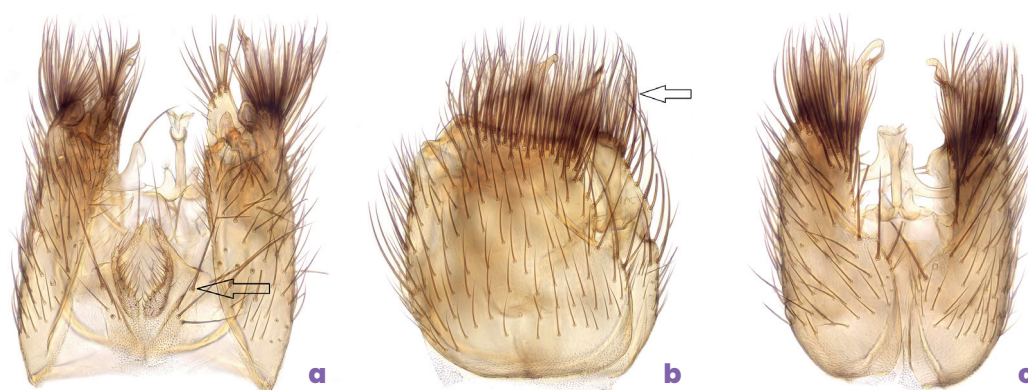


Figure 90. *Brachycampta barbata*. (a) dorsal, (b) lateral (dense bristling arrowed) and (c) ventral view of ♂ genitalia.

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2. Gonostylus longer than gonocoxites 3
 - Gonostylus about as long as or shorter than gonocoxites 4
3. Gonostylus with slender dorsal lobe (dl) subequal in length to broad ventral lobe (vl) *protenta* (Laštovka & Matile, 1974) (p. 121)
 - Gonostylus with slender dorsal lobe (dl) distinctly shorter than broad ventral lobe (vl) *foliifera* Strobl, 1910 (p. 120)

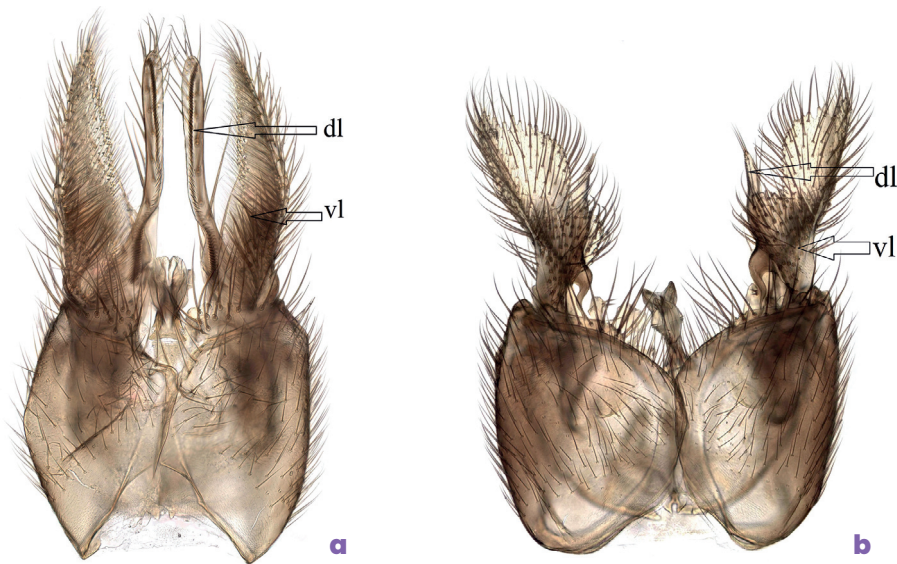


Figure 91. Ventral view of ♂ genitalia of *Brachycampta*: (a) *protenta*; (b) *foliifera*.

4. Gonostylus about as long as gonocoxites with both lobes narrow and elongate 5
 - Gonostylus shorter than gonocoxites, often with one lobe broad 6

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5. Gonostylus with dorsal lobe (dl) shorter than ventral lobe (vl) *pistillata* Lundström, 1911 (p. 121)
- Gonostylus with dorsal lobe (upper arrow) longer than ventral lobe (lower arrow) *angulata* Lundström, 1913 (p. 119)

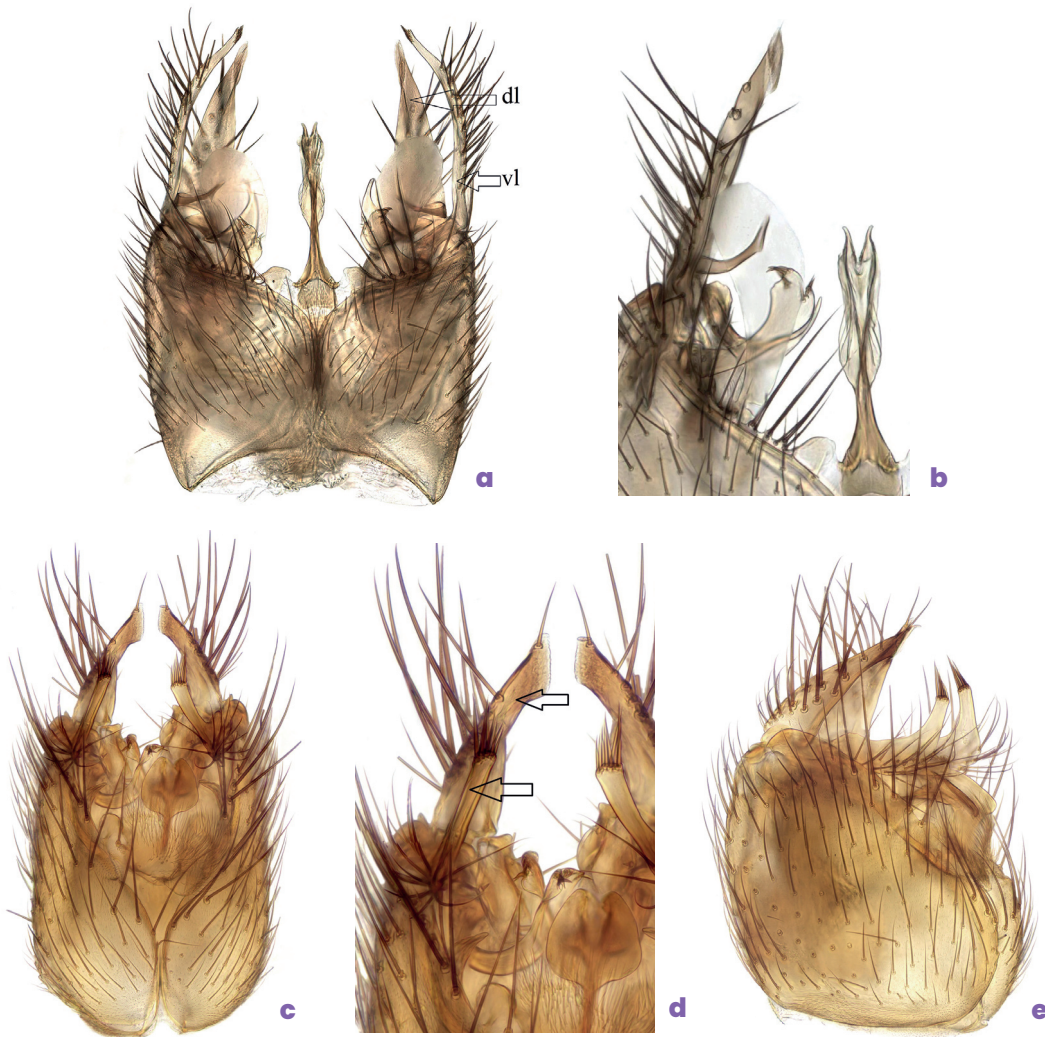


Figure 92. *Brachycampta pistillata*: (a) ventral view of ♂ genitalia; (b) gonostylus. *Brachycampta angulata*: (c) ventral view of ♂ genitalia; (d) gonostylus ventral and (e) lateral view.

6. Gonostylus with dorsal lobe broad and with one or more medial appendages 7
- Gonostylus with dorsal lobe narrow without any medial appendages 9

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- 7 Gonostylus with dorsal lobe bearing two medially directed appendages (both arrowed) *grata* (Meigen, 1830) (p. 120)
- Gonostylus with dorsal lobe bearing a single medially directed appendage 8
8. Medial appendage of dorsal lobe of gonostylus uniformly sclerotised with apical comb (lower arrow). Ventral lobe of gonostylus narrow (upper arrow) *czernyi* (Landrock, 1912) (p. 119)
- Medial appendage of dorsal lobe of gonostylus only sclerotised apically (lower arrow). Ventral lobe of gonostylus broad (upper arrow) *alternans* (Zetterstedt, 1838) (p. 119)

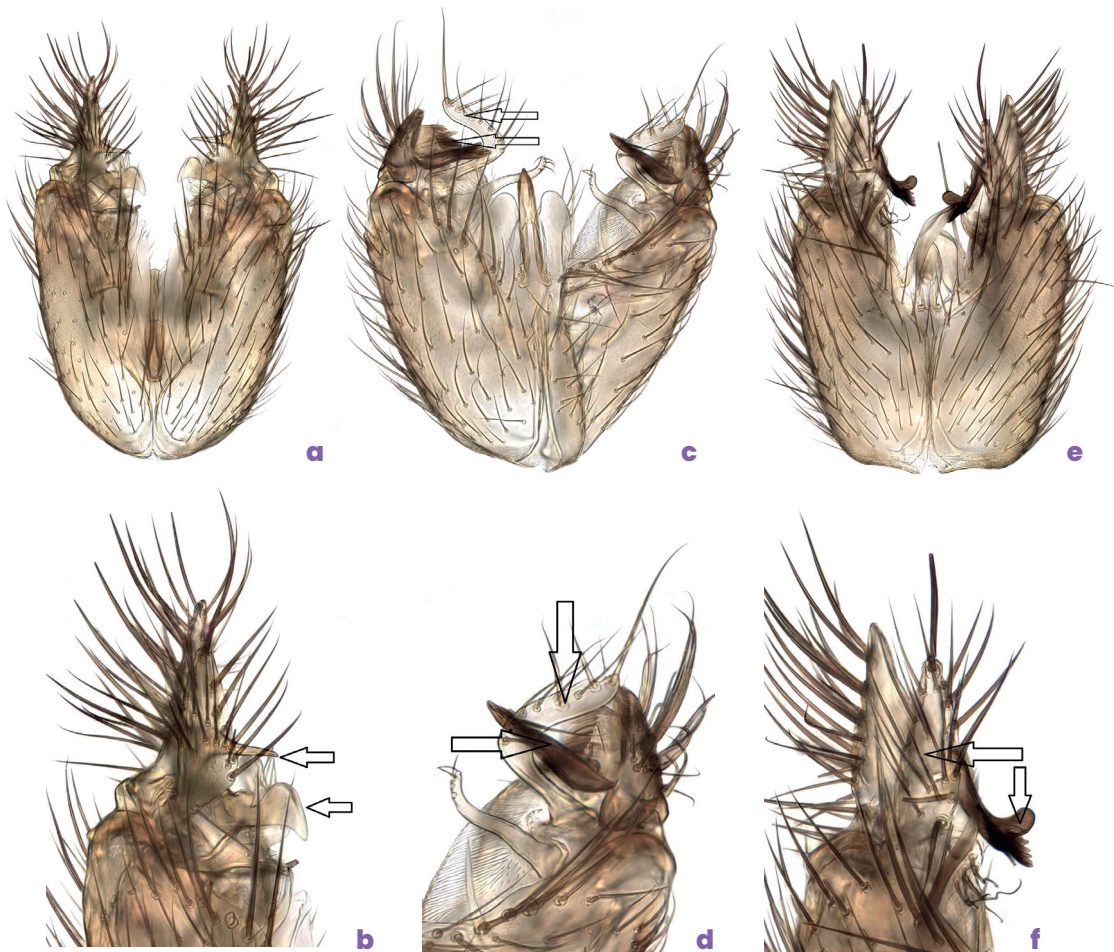


Figure 93. *Brachycampta grata*: (a) ventral view of ♂ genitalia and (b) gonostylus. *Brachycampta czernyi*: (c) ventral view of ♂ genitalia and (d) gonostylus. *Brachycampta alternans*: (e) ventral view of ♂ genitalia and (f) gonostylus.

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9. Gonostylus with dorsal lobe (lower arrow) short, blunt apically, nearly as long as ventral lobe, which bears long bristling (upper arrow) on all surfaces *neglecta* (Edwards, 1925) (p. 120)
- Gonostylus with dorsal lobe distinctly shorter than ventral lobe, which has long fine bristling mainly restricted to its distal margin (lower arrow in both species) 10
10. Gonostylus with dorsal lobe comprising a rounded base, bearing a narrow rod-like appendage (upper arrow) *silvatica* Landrock, 1912 (p. 121)
- Gonostylus with dorsal lobe tapered medially to blunt tip but apical portion not a discrete appendage (upper arrow) *westerholti* (Caspers, 1980) (p. 121)

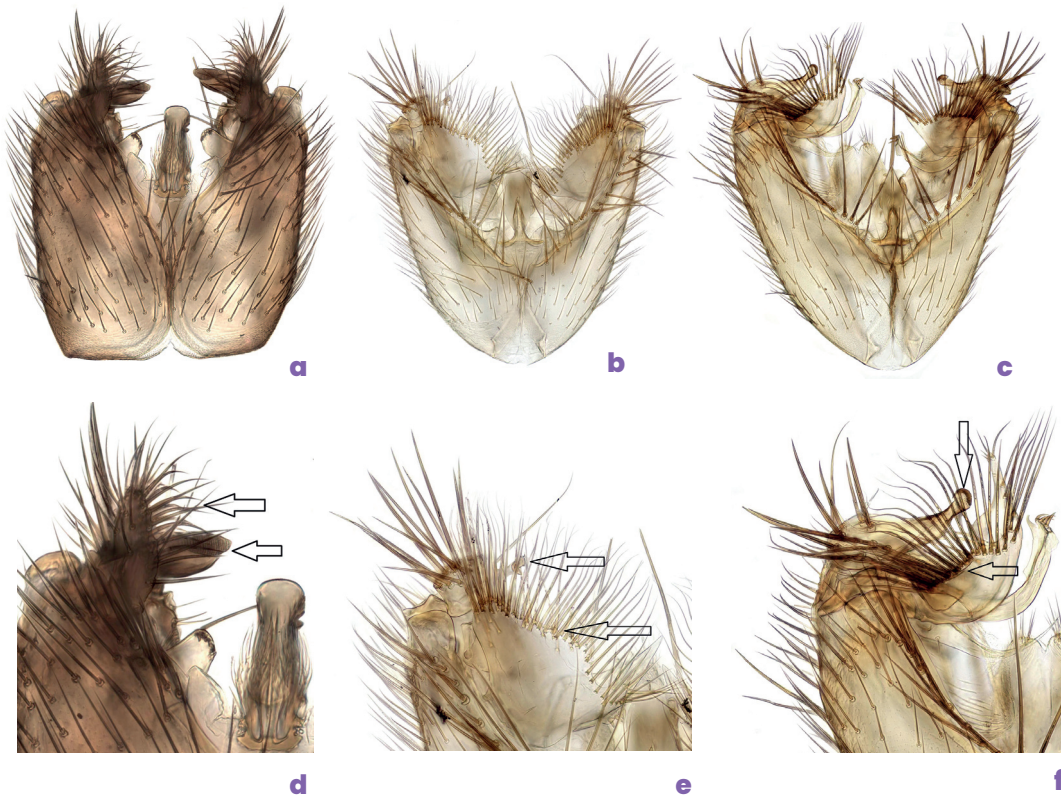


Figure 94. *Brachycampta neglecta*: (a) ventral view of ♂ genitalia; (d) gonostylus.
Brachycampta silvatica: (b) ventral view of ♂ genitalia; (e) gonostylus.
Brachycampta westerholti: (c) ventral view of ♂ genitalia; (f) gonostylus.

Species notes

Brachycampta alternans (Zetterstedt, 1838)

Distribution. Local but widespread throughout Britain; a few Irish records. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. It develops in a wide range of terrestrial and saproxylic fungi as well as several genera of large agarics. **British records:** *Crepidotus* sp. (J. Webb). **Other records:** *Agrocybe praecox*, *Amanita rubescens*, *Gymnopus ocior*, *Hygrophoropsis aurantiaca*, *Lactifluus volemus*, *Lepiota cristata*, *Leucocybe connata*, *Lyophyllum decastes*, *Macrolepiota procera*, *Megacollybia platyphylla*, *Mycena pura*, *Paralepista flaccida*, *Paxillus involutus*, *Peziza* sp., *Russula xerampelina*, *Tricholomopsis rutilans*, *Tubaria confragosa*, *Xerocomellus chrysenteron* (Dely-Draskovits 1974, Kurina 1991, Plassmann 1971, Ševčík 2006 and 2010, and Russian records cited by Jakovlev 1994).

Brachycampta angulata Lundström, 1913

Distribution. A rather local species, with most records from the 1980s Welsh and East Anglian wetland surveys; scattered records from elsewhere in England and some recent Scottish records; a record from Devon in 2012 was the first from SW England. Widespread in N and W Europe.

Habitat. Recorded from the vicinity of woodland streams, in carr and a variety of other wetland habitats.

Biology. Unknown.

Brachycampta barbata Lundström, 1909

Distribution. Widespread in England and Wales, with many records from the 1980s Welsh and East Anglian wetland surveys; in Scotland most records are from the central Highlands. One Irish record (Westport, Co Mayo, 20.ix.2000), also in the Scilly Isles (St Mary's, 21.viii.2013, E. McAlister) and Jersey. Holarctic, widespread in Europe.

Habitat. Damp woodland and carr, as well as other wetland habitats.

Biology. Develops mainly in cup fungi (Pezizales) but there are also records from a range of other terrestrial and saproxylic fungi, including agarics and boletes. **British records:** *Peziza repanda* (Buxton 1960 included this under *A. silvatica*, which he also reared), *P. vesiculosa* (Chandler 1993b). **Other records:** *Peziza micropus* (Ševčík 2006), *Legalliana badia* (Ševčík 2010), *Peziza varia* (Dely-Draskovits 1974), *Gyromitra infula* (Hackman and Meinander 1979), *Kuehneromyces mutabilis*, *Leccinum versipelle*, *Verpa bohemica* (Jakovlev 1994, his rearings from Karelia).

Brachycampta czernyi Landrock, 1912

Distribution. Mostly recorded from the Scottish Highlands (most of the principal Highland areas – Rannoch, Braemar, Spey and Findhorn valleys, E and W Ross), otherwise known from Norfolk (Holtham, 1987; Holt Country Park, 1998), Suffolk (Brandon Country Park, 2019) and Cumbria (Whinfell Forest, 2005, 2007). Holarctic, widespread in Europe.

Habitat. Mostly recorded from pine woodland, both Caledonian pine forest and plantations, like those in Norfolk, but also some broad-leaved sites.

Biology. Rearing records from several genera of mainly terrestrial agarics and boletes. **British records:** *Cortinarius semisanguineus* (pine associated: Chandler 1993b). **Other records:** *Cortinarius purpureus* (Dely-Draskovits 1974), *Cortinarius* sp. (Kurina 1991), *Cortinarius cinnamomeoluteus*, *C. malicorius*, *Tricholoma sulphureum* (Ševčík 2006), *Agrocybe praecox*, *Chalciporus piperatus*, *Paralepista flaccida*, *Pholiota vernalis*, *Megacollybia platyphylla*, *Russula vesca*, *Suillus granulatus* (Russian records cited by Jakovlev 1994).

***Brachycampta foliifera* Strobl, 1910**

Distribution. Widespread with an apparently disjunct distribution; records from several areas within the Scottish Highlands (21 hectads), a few records in S England (5 hectads in Berks, Bucks and Kent) and one Welsh record (Oxwich Woods, Gower, 28.vi.1994, I. Perry). Holarctic, widespread in Europe.

Habitat. Broad-leaved and mixed woodland.

Biology. Fungus hosts include the terrestrial cup fungi *Peziza* and *Legaliana* spp, and the saproxylic *Exidia cartilaginea*. **British records:** *Peziza repanda* (Buxton 1960). **Other records:** *Peziza micropus* (Ševčík 2006, 2010), *Exidia cartilaginea* on rotting birch log, *Legaliana badia* (Jakovlev 2011).

***Brachycampta grata* (Meigen, 1830)**

Distribution. Common in Wales and in England north to Durham and Cumbria, but only a few Scottish records (7 hectads); widespread in Ireland, also in Isle of Man. Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. Develops in terrestrial and saproxylic agarics, also records from boletes and the beef-steak fungus *Fistulina hepatica*. **British records:** *Hebeloma crustuliniforme*, *Paxillus involutus* (Edwards 1925), *Pluteus cervinus*, *P. salicinus*, *Xerocomellus chrysenteron* (Chandler 1993b), *Megacollybia platyphylla* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Amanita*, *Armillaria*, *Boletus*, *Calocybe*, *Cerioporus squamosus*, *Cortinarius*, *Crepidotus*, *Entoloma*, *Fistulina*, *Gymnopilus*, *Gymnopus*, *Hygrophoropsis*, *Inocybe*, *Laccaria*, *Leccinum*, *Lepiota*, *Leucocortinarius*, *Megacollybia*, *Mycena*, *Omphalotus*, *Pluteus*, *Rhodocollybia*, *Russula*, *Stropharia*, *Tricholoma*, *Tricholomopsis* (Barendrecht 1938, Dely-Draskovits 1974, Eisfelder 1955 and 1956, Hackman and Meinander 1979, Kurina 1991, Plassmann 1971, Rimšaite 2000, Ševčík 2006 and 2010, and Russian records cited by Jakovlev 1994).

***Brachycampta neglecta* (Edwards, 1925)**

Distribution. Local but widespread throughout Britain; two Irish records (Charleville Woods, Co Offaly, 1985; Inisherik Island in Upper Lough Erne, Co Fermanagh, 2007). Palearctic, widespread in Europe.

Habitat. Mainly wet woodland and carr.

Biology. **No British records. Other records:** in eastern Europe from the ascomycetes *Verpa bohemica* and *Gyromitra*, and the saproxylic agaric *Pholiota vernalis* (Jakovlev 1994, his rearings from Karelia), and from *Helvella crispa* (Ševčík 2010).

***Brachycampta pistillata* Lundström, 1911**

Distribution. Local but widespread in Britain, but with relatively few Scottish records. One Irish record (St John's Wood, Co Roscommon, 7.vi.2010). Holarctic, widespread in Europe, also in the Atlantic islands.

Habitat. Woodland and wetland habitats.

Biology. **No British records. Other records:** develops in cup fungi (a Russian record from *Peziza* sp., Jakovlev 1994, his rearing from Karelia).

***Brachycampta protenta* (Laštovka & Matile, 1974)**

Distribution. Only recorded in mainland Britain from the 1980s wetland surveys in Anglesey (2 hectads) and East Anglia (10 hectads), except for a recent Scottish record (Glen Feshie, 1.ix.2016); there is also a 1989 record from the Isle of Man (Cromle-y-Veddy, S.M. Crellin). Holarctic, widespread in Europe.

Habitat. The British records are from wetlands, including carr, reedbeds and wet meadows.

Biology. Unknown.

***Brachycampta silvatica* Landrock, 1912**

Distribution. Scattered throughout England although mostly in the eastern counties (11 hectads), north to Durham (Castle Eden and Nesbitt Denes, 1992); also in Anglesey (Cors Erddreiniog, 1988) and two N Irish records (Crawfordsburn, 1988; The Misk, Drenagh, 2006). Palaearctic, widespread in Europe.

Habitat. Near woodland streams.

Biology. All rearing records are from ascomycetes (Pezizales). **British records:** *Aleuria aurantia*, *Peziza varia* (Chandler 1993b), *P. repanda* (Buxton 1960). **Other records:** *Legaliana badia* (Ševčík 2006), *Peziza repanda* (Ševčík 2010), *Gyromitra ancilis*, *Verpa bohemica* (Jakovlev 1994, his rearings from Karelia), *Discina fastigiata* (Dely-Draskovits and Babos 1993), *Discina caroliniana* (Dely-Draskovits 1974), *Paragalactinia succosa* (Jakovlev 2011).

***Brachycampta westerholti* (Caspers, 1980)**

Distribution. Local in S England (9 hectads) north to Gloucs and Oxon with a slight recent increase in records, and one recent Welsh record: Piercefield Wood, Gwent (2.x.2019, K. Alexander). Widespread in Europe; not known from the Nordic region.

Habitat. Broad-leaved woodland, mainly beechwoods on chalk or limestone.

Biology. Unknown, although Jakovlev (2012) suggested an association with cup fungi.

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Genus *Brachypeza* Winnertz

Rather stout-bodied gnats with short antennae and strong legs. Mainly brownish yellow with three dark stripes on mesonotum, abdomen brown with yellow apical margins to tergites, legs yellow. Antennae have flagellomeres 2-13 shorter than broad and close together. Clypeus broader than high. Mesonotum broadly rounded or humped with dorsocentral series of bristles very short (*B. armata*) or absent (other species). Anepisternum with short pale decumbent bristles. Two-three pairs of strong scutellars, 4-6 proepisternals. Vein Sc short and ending in R. Crossvein r-m longer than stem of median fork. Base of posterior fork well before that of the median fork. Fork veins setulose, r-m and bm-m bare. Fore tibia about as long as its femur. Fore tarsi modified in males of some species. Hind tibia with a weak posterior bristle near tip (a longer series in *B. armata*); its longer spur well exceeding half length of tarsomere 1. Wing length 3.5-4.5 mm.

Male genitalia small, shorter than tergite 6. Female cercus two-segmented.

The subgenus *Brachypeza* sensu stricto includes 3 European species, all found in Britain, which are among the 5 species keyed by Zaitzev (2003). There is a fourth European species included in the subgenus *Ristocordyla* Rindal & Sæli, 2010 (= *Paracordyla* Tuomikoski, 1966, preocc.), *B. obscura* Winnertz, 1864. This is distinguished by shorter antennae (flagellum only as long as frons and vertex together), stem of median fork longer than crossvein r-m and vein CuP absent.



Figure 95. (a) *Brachypeza bisignata* ♂. Wings of *Brachypeza*: (b) *bisignata*; (c) *armata*; (d) *radiata*.

Key to *Brachypeza* Winnertz

1. Wing unmarked. Male with second tarsomere of fore tarsus enlarged and bearing short spines. Scutellum with 4 strong bristles *armata* Winnertz, 1864 (p. 124)
- Wing with dark spots or bands 2

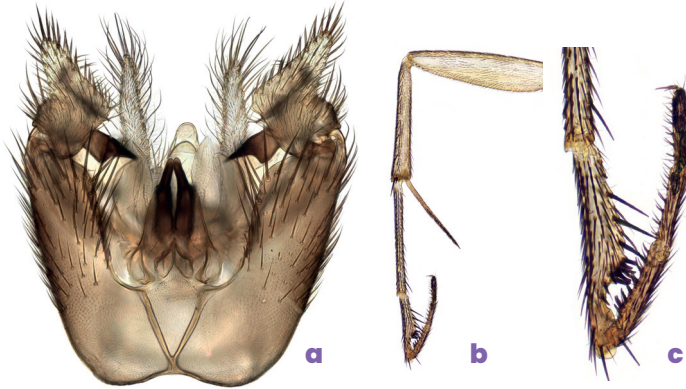


Figure 96. *Brachypeza armata*: (a) ventral view of ♂ genitalia; (b) male fore leg; (c) closer view of second tarsomere.

2. Wing with distinct central and apical spots. Male without long bristles on inner side of fore tarsus. Scutellum with 4 strong bristles *bisignata* Winnertz, 1864 (p. 124)
- Wing with central spot and indistinct preapical band. Male with 3-4 long bristles on inner side of second tarsomere of fore tarsus. Scutellum with 6 strong bristles *radiata* Jenkinson, 1908 (p. 124)

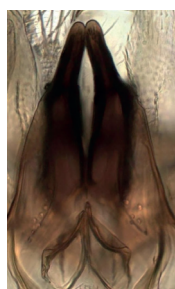
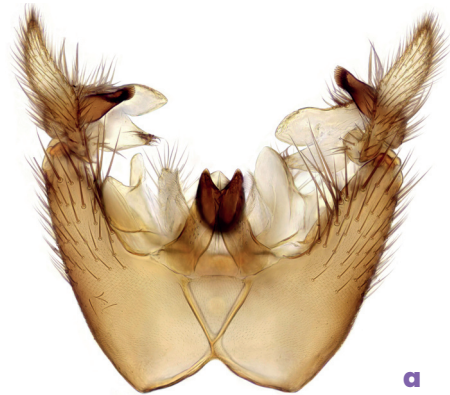


Figure 97. Ventral view of ♂ genitalia of *Brachypeza*: (a) *bisignata*; (b) *radiata*. Hypandrial lobe of *Brachypeza*: (c) *armata*; (d) *bisignata*; (e) *radiata*.

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Species notes

Brachypeza armata Winnertz, 1864

Distribution. Widely distributed in Wales, and England north to Yorkshire and Cumbria. Three Irish localities in one hectad of Co Kerry (Killarney, 5.v.1981 and Cloghereen Pool Wood, 8.v.1981, Chandler; Torc Cascade, 10.ix.1981, J. O'Connor). Also in Isle of Man. Palearctic, widespread in Europe.

Habitat. Wooded habitats, around dead wood bearing oyster mushrooms *Pleurotus* species.

Biology. Rearing records are mainly from *Pleurotus*. **British records:** *Pleurotus ostreatus* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Cortinarius* sp., *Hericium coralloides*, *Pleurotus ostreatus*, *P. pulmonarius* (Russian records cited by Jakovlev 1994), *P. cornucopiae*, *P. pulmonarius* (Ševčík 2006, Czech Republic).

Brachypeza bisignata Winnertz, 1864

Distribution. Widespread throughout Britain, with clusters of records in S England, N Wales and the Scottish Highlands and a recent increase in records. Chandler (2018b) recorded it from Ireland (Breen Wood, Co Antrim, viii-x.2017, A. Mantell). Also in Isle of Man. Palearctic, widespread in Europe.

Habitat. Wooded habitats, around dead wood bearing oyster mushrooms *Pleurotus* species.

Biology. *Pleurotus* spp are the preferred hosts but also reared from the terrestrial agaric *Infundibulicybe* and the puffball *Apioperdon*. **British records:** *Pleurotus ostreatus* (J. Webb), visiting this fungus (Chandler 1978b). **Other records:** *Apioperdon pyriforme*, *Infundibulicybe gibba*, *Pleurotus ostreatus*, *P. pulmonarius* (Russian records cited by Jakovlev 1994), *P. pulmonarius* (Ševčík 2006).

Brachypeza radiata Jenkinson, 1908

Distribution. Widespread in England north to Yorkshire, with only two Welsh records (Crêst Mawr, Denbighshire, 1994; Mynydd Ddu Forest, Brecon, 1997). Apparently less frequent than other *Brachypeza* species, although it may now be increasing for the same reasons. Widespread in Europe.

Habitat. Formerly a widespread hedge species in SE England, associated with *Pleurotus* on elm and it probably suffered a decline due to Dutch elm disease. Now most often found in woodland on *Pleurotus* on beech, like other species of the genus.

Biology. **British records:** the large larvae may be abundant in *Pleurotus cornucopiae* (Buxton 1960, reported only as *Pleurotus* sp. by Edwards 1925 and Madwar 1937; rearings by P. Chandler), *P. ostreatus* (Trifourkis 1977). **Other records:** also *P. cornucopiae* (Ševčík 2006), but a record from *Armillaria mellea* (Kurina 1991).

Genus *Brevicornu* Marshall

Small slender mainly dark coloured or brownish gnats with a variable amount of yellow coloration sometimes present on tergites 2-4, and slender yellow legs. Antennae sexually dimorphic, slender in male but flagellum often more or less swollen basally in female. Clypeus short and rounded. Mesonotum with bristles irregularly dispersed and decumbent. Scutellars variable, one or two strong pairs. Three or more proepisternal bristles. Anepisternum bare. Vein Sc ending in R. Crossvein r-m and stem of median fork subequal, or one or other longer. Base of posterior fork below or before that of the median fork. Fork veins bare, crossveins r-m and bm-m bare. False vein and CuP weakly developed, false vein extending much less than half length of posterior fork. Hind coxa with one posterobasal bristle, otherwise short weak setulae. Hind tibia with short posterior bristles in a single row towards tip, its spurs half or more length of tarsomere 1. Wing length mostly 2.0-3.5 mm, to 4.0 mm for *B. canescens*.

Male genitalia with deep ventral excavation of gonocoxites, containing a small hypandrial lobe with a highly specific structure; tergite 9 without very long bristles. Female cercus two-segmented.

There are 31 European species, of which 24 are recorded from Britain. Of these 18 are included among the 32 species keyed by Zaitzev (2003). Most species of this genus lack external specific characters and females cannot be reliably determined. Coloration is variable and is summarised within square brackets in key couplets.



Figure 98. (a) *Brevicornu griseicollis* ♂. (b) *Brevicornu verralli* ♂.

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Key to *Brevicornu* Marshall

1. Vein M_2 abbreviated, not reaching wing margin (arrowed). Hypandrial lobe (arrowed) rounded basally, then constricted before apical expansion. [Mainly yellowish brown, mesonotum darker dorsally; tergites 1-4 (-5) mostly yellow, dark dorsally, 6 may be yellow apically, gonocoxites brown; hind femur dark apically] *serenum* (Winnertz, 1864) (p. 142)
- Vein M_2 reaching wing margin 2

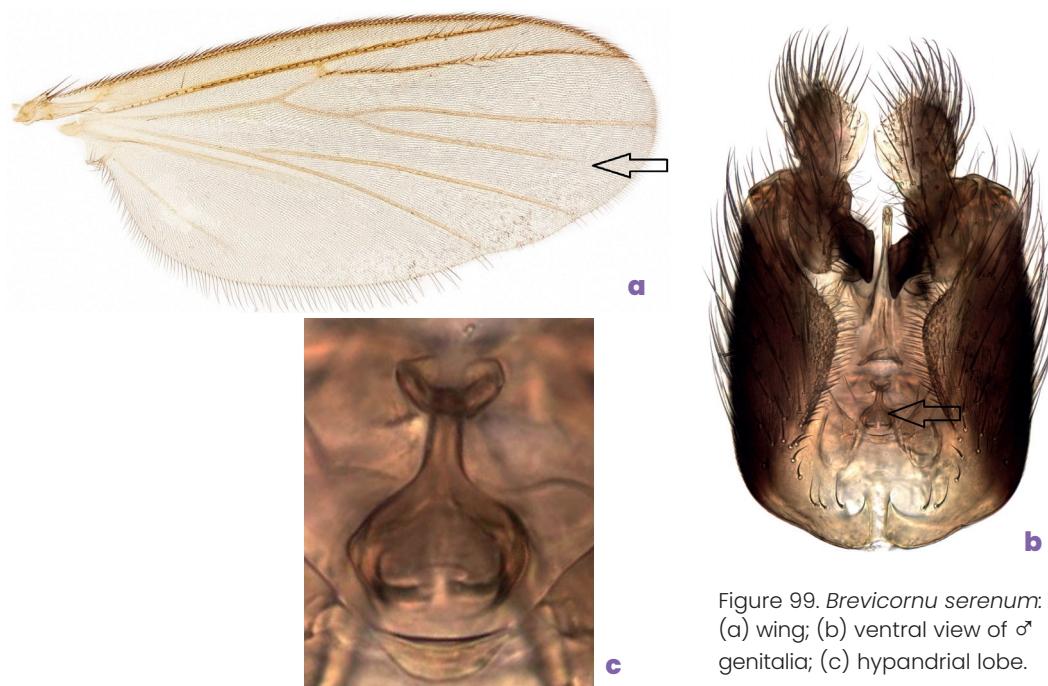


Figure 99. *Brevicornu serenum*.
(a) wing; (b) ventral view of ♂
genitalia; (c) hypandrial lobe.

2. Gonostylus with narrow and pointed bristly ventral lobe (upper arrow in ventral view of *B. fuscipenne*), as long as or longer than dorsal lobe, which is also longer than broad 3
- Gonostylus with ventral lobe shorter than dorsal lobe or, if as long or longer differently formed 7
3. Gonocoxites with hypandrial lobe shorter than broad, with simple slightly concave apical margin (lower arrow in ventral view and apical margin arrowed in enlarged figure of this lobe). Medial lobe of gonostylus with an apical hook (arrowed in figure of that lobe). [Mesonotum grey; tergites 1-4 yellow laterally, sometimes extending dorsally on hind margins of 3-4; genitalia yellow] *fuscipenne* (Staeger, 1840) (p. 140)
- Gonocoxites with hypandrial lobe longer than broad, usually with a medial excavation 4

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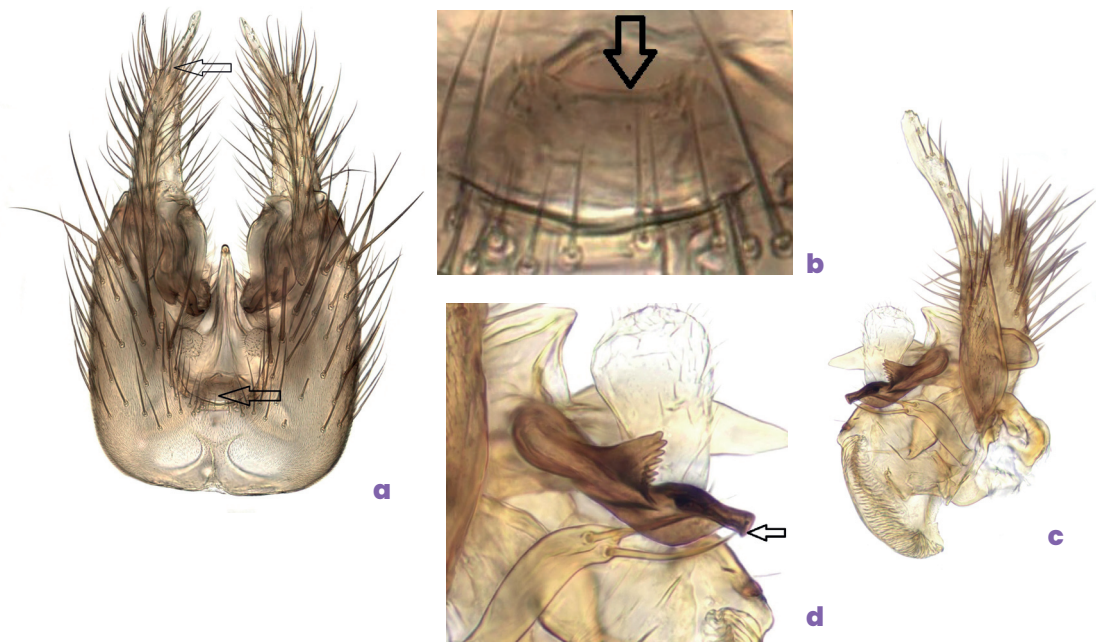


Figure 100. *Brevicornu fuscipenne*: (a) ventral view of ♂ genitalia; (b) hypandrial lobe; (c) gonostylus; (d) medial lobe.

4. Gonocoxites with hypandrial lobe narrow and shallowly indented apically (right arrow; apically rounded according to original description). Gonostylus without a small lobe with 2 thick curved spines; medial lobe constricted (left arrow) before apical expansion. [Mesonotum grey with yellow side margins; tergites 1-4 yellow laterally, extended dorsally on hind margins of 2-3; genitalia yellow] *glandis* Laštovka & Matile, 1974 (p. 140)
- Gonocoxites with hypandrial lobe broad, with distinct medial excavation apically. Gonostylus with a small lobe bearing 2 thick curved spines 5

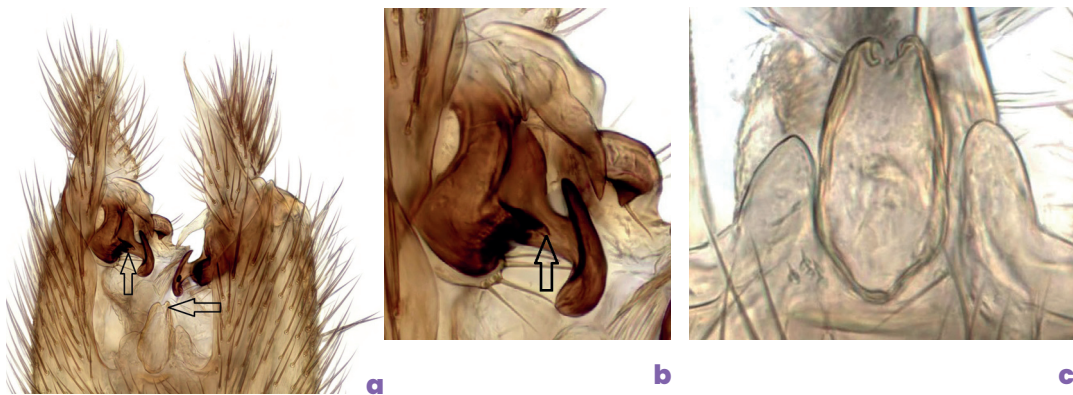


Figure 101. *Brevicornu glandis*: (a) ventral view of ♂ genitalia; (b) close up of medial lobe; (c) hypandrial lobe.

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5. Gonostylus with medial lobe apically bifurcate (arrowed in ventral view and view of medial lobe), flanked by an awl-shaped process (arrowed in internal view of medial lobe). Hypandrial lobe rounded apically with medial cleft (arrowed in figure of this lobe). [Very variable body coloration, from all dark to mostly yellowish brown, usually tergites 1-4 (-5) yellow laterally; genitalia yellow] *griseicollе* (Staeger, 1840) (p. 141)
- Gonostylus with medial lobe without an awl-shaped process. Hypandrial lobe with V-shaped apical margin (arrowed in figure of this lobe for both species) 6

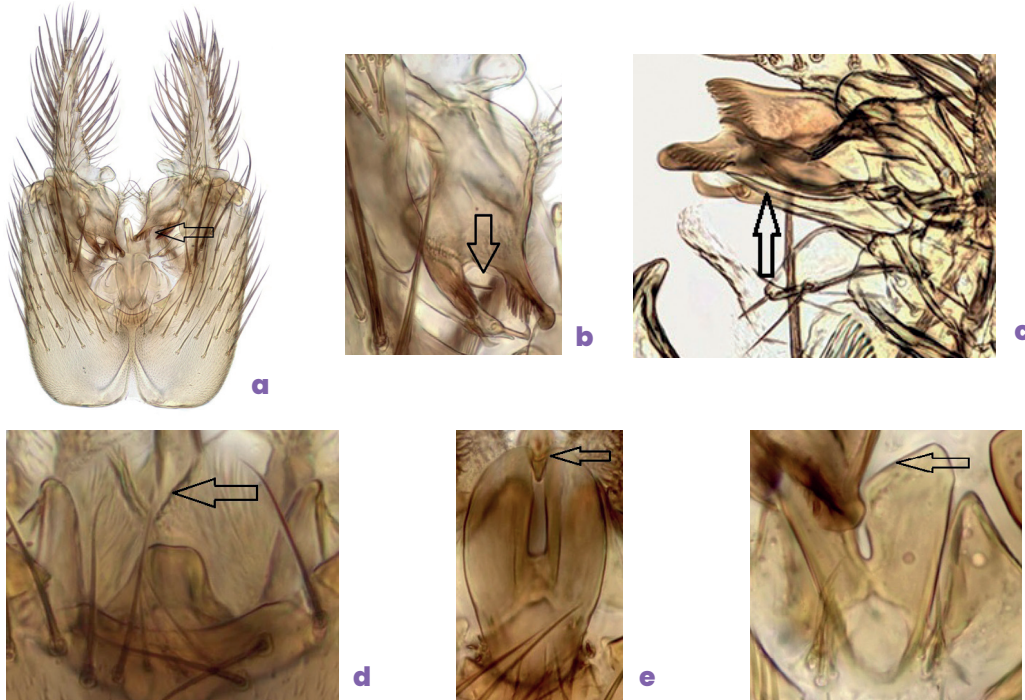


Figure 102. *Brevicornu griseicollе*: (a) ventral view of ♂ genitalia; (b) medial lobe of gonostylus; (c) awl-shaped process. Hypandrial lobes of *Brevicornu*: (d) *rosmellitum*; (e) *griseicollе*; (f) *nigrofusum*.

6. Gonostylus with medial lobe constricted before a flap-like apical appendage (arrowed). [Mesonotum grey; tergites 1-3 yellow laterally, 4 yellow basally; gonocoxites brownish yellow] *nigrofusum* (Lundström, 1909) (p. 141)



Figure 103. *Brevicornu nigrofusum*: (a) ventral view of ♂ genitalia; (b) medial lobe of gonostylus.

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- Gonostylus with medial lobe less constricted before a hook-like apical appendage (arrowed in ventral view and in figure of gonostylus). [Mesonotum brown, paler laterally; tergites 1-4 yellow laterally] *rosmellitum* Chandler, 2001 (p. 142)

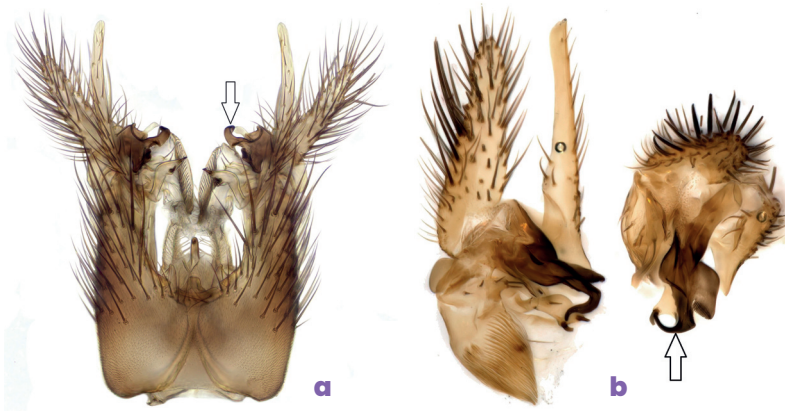


Figure 104. *Brevicornu rosmellitum*: (a) ventral view of ♂ genitalia; (b) gonostylus.

7. Gonostylus with narrow and pointed ventral lobe that is shorter than the dorsal lobe and bears a row of strong bristles medially (left arrow in figures of gonostylus for both species, *kingi* and *sericoma*) 8
- Gonostylus with ventral lobe as long as or longer than dorsal lobe or if shorter differently formed 9
8. Gonostylus with dorsal lobe elongate, not strongly curved (right arrow). Proepisternum with 5 long bristles. [Mesonotum with fused dark stripes, yellow on humeral area and sides; tergites 1-2 yellow laterally, 3-4 almost all yellow, with dark dorsal stripe; genitalia yellow] *kingi* (Edwards, 1925) (p. 141)

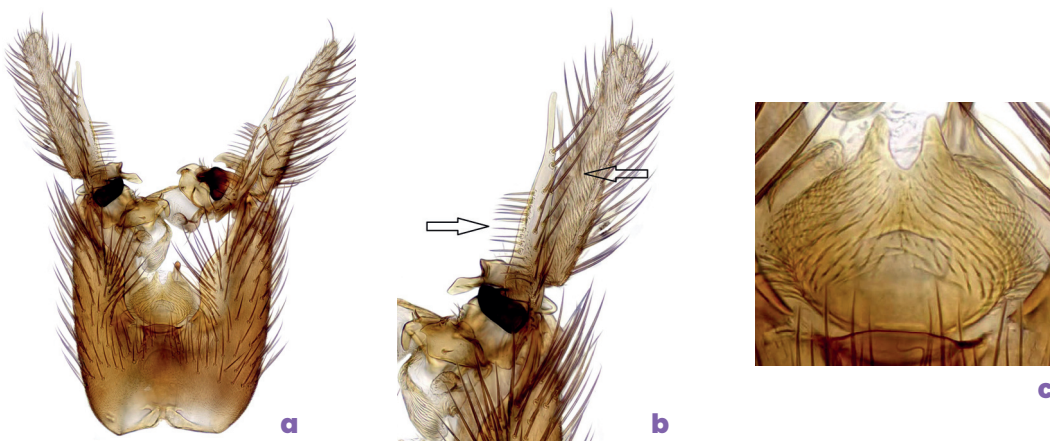


Figure 105. *Brevicornu kingi*. (a) ventral view of ♂ genitalia; (b) gonostylus; (c) hypandrial lobe.

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- Gonostylus with dorsal lobe broader, strongly curved medially (right arrow). Proepisternum with 3 long bristles. [Very variable body coloration, from all dark to mostly yellowish brown, usually tergites 1-4 (-5) yellow laterally; genitalia yellow] *sericornis* (Meigen, 1830) (p. 143)

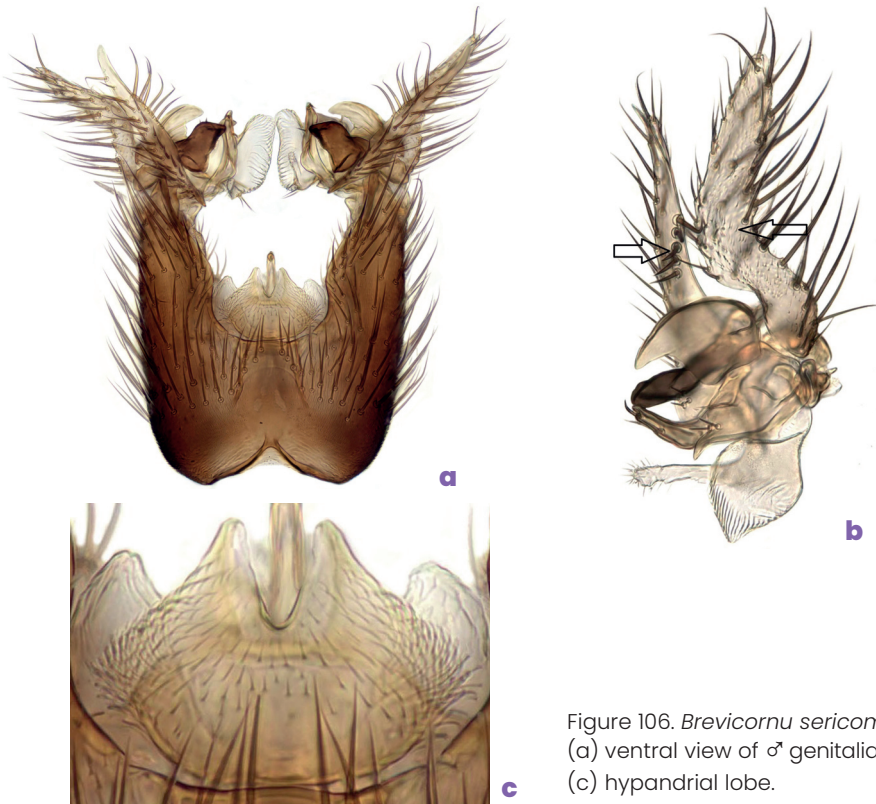


Figure 106. *Brevicornu sericornis*.
 (a) ventral view of ♂ genitalia; (b) gonostylus;
 (c) hypandrial lobe.

9. Hypandrial lobe elongate and deeply bifurcate, behind a small rounded process of gonocoxal margin 10
 - Hypandrial lobe differently formed, if bifurcate not longer than broad 11
10. Gonostylus longer than gonocoxites, with ventral lobe (upper arrow) tapered apically. Hypandrial lobe with branches narrow and bifurcate apically (lower arrow and arrowed in enlarged view). Hind tibia with row of 10-12 bristles on inner side. [Mesonotum all grey dusted; abdomen all dark or tergites 1-3 (-4) more or less distinctly yellow laterally; gonocoxites brown] *ruficornis* (Meigen, 1838) (p. 142)
 - Gonostylus not longer than gonocoxites, with ventral lobe (upper arrow) blunt apically. Hypandrial lobe (lower arrow) with branches broad and entire, and with serrated inner margin (arrowed in enlarged view) apically. [Mesonotum all grey; tergites 2-4 with apical yellow triangles; gonocoxites brown] *foliatum* (Edwards, 1925) (p. 140)

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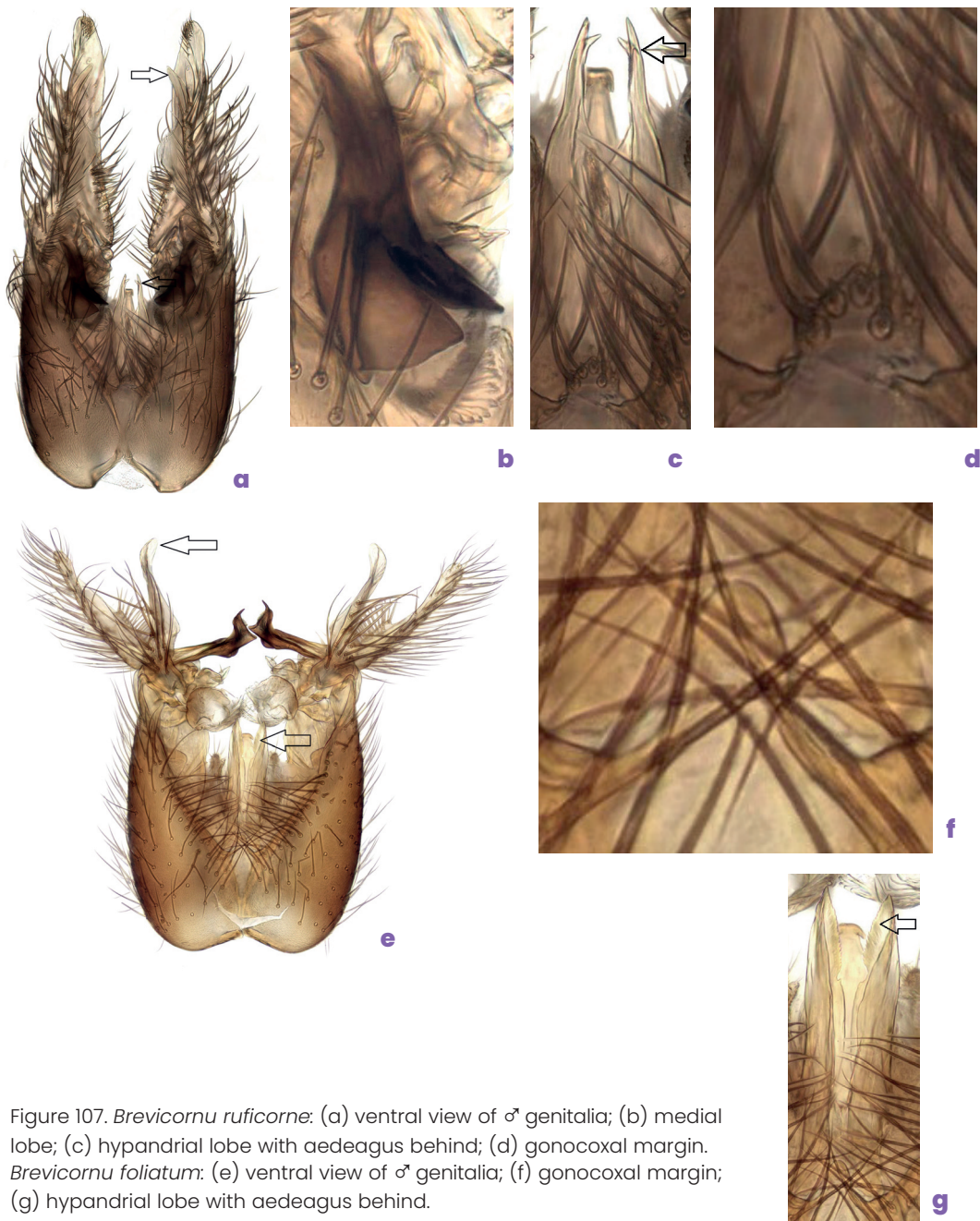


Figure 107. *Brevicornu ruficorne*: (a) ventral view of ♂ genitalia; (b) medial lobe; (c) hypandrial lobe with aedeagus behind; (d) gonocoxal margin. *Brevicornu foliatum*: (e) ventral view of ♂ genitalia; (f) gonocoxal margin; (g) hypandrial lobe with aedeagus behind.

11. Gonostylus with ventral lobe blunt ended and not narrow and tapered apically 12
- Gonostylus with ventral lobe either pointed or narrow and tapered apically 16

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12. Hypandrial lobe (arrowed) smoothly rounded apically. [Generally dark coloured including gonocoxites] *griseolum* (Zetterstedt, 1852) (p. 141)
- Hypandrial lobe apically concave or at least narrowly cleft medially 13

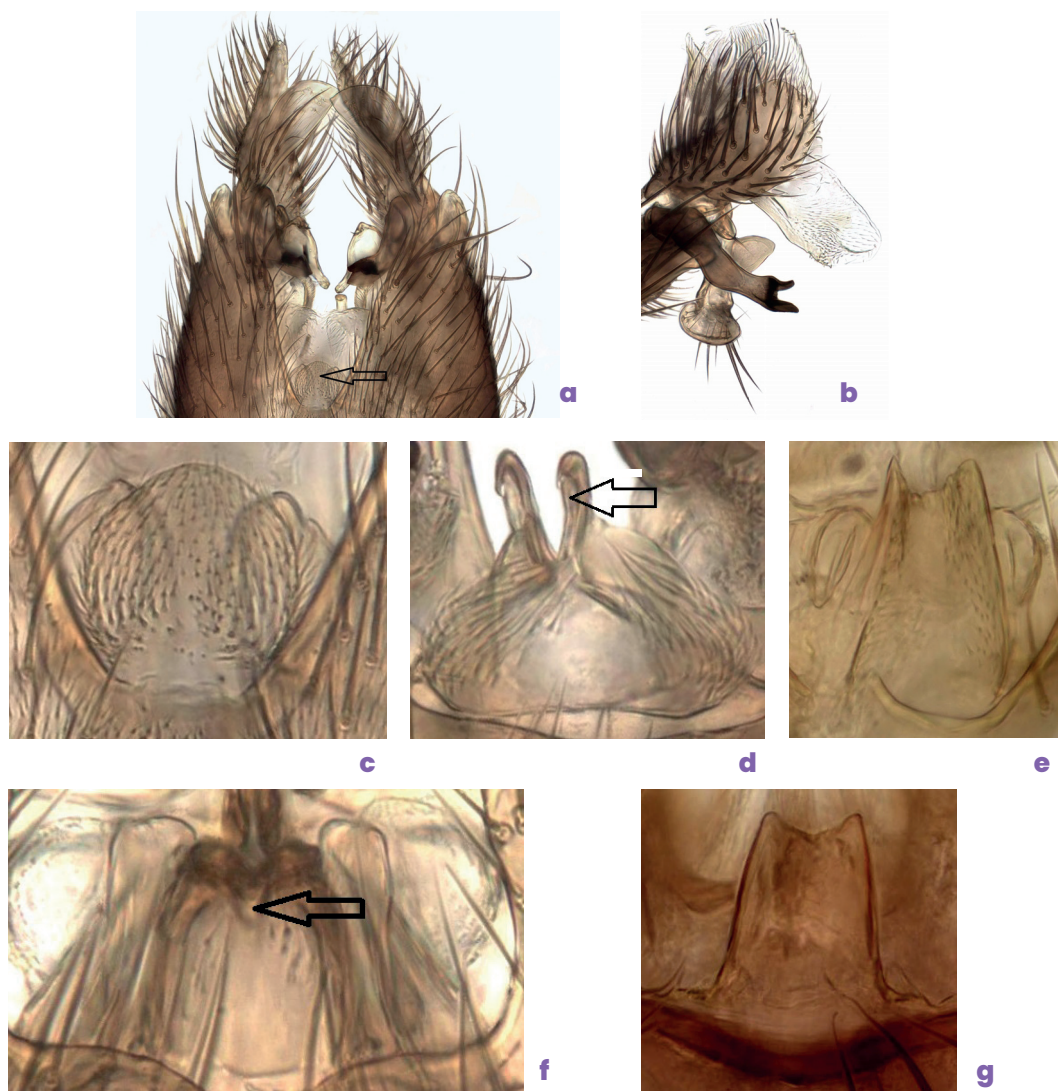


Figure 108. *Brevicornu griseolum*: (a) ventral view of ♂ genitalia; (b) gonostylus. Hypandrial lobe of *Brevicornu*: (c) *griseolum*; (d) *arcticoides*; (e) *improvisum*; (f) *auriculatum*; (g) *canescens*.

13. Hypandrial lobe with deep cleft (arrowed, Figs 108d and 109a) between a pair of blunt processes apically. [Mesonotum dark dorsally, yellow laterally; tergites 2-4 yellow laterally, narrowly dark dorsally; genitalia yellow or brownish] *arcticoides* Caspers, 1985 (p. 139)
- Hypandrial lobe only shallowly concave apically 14

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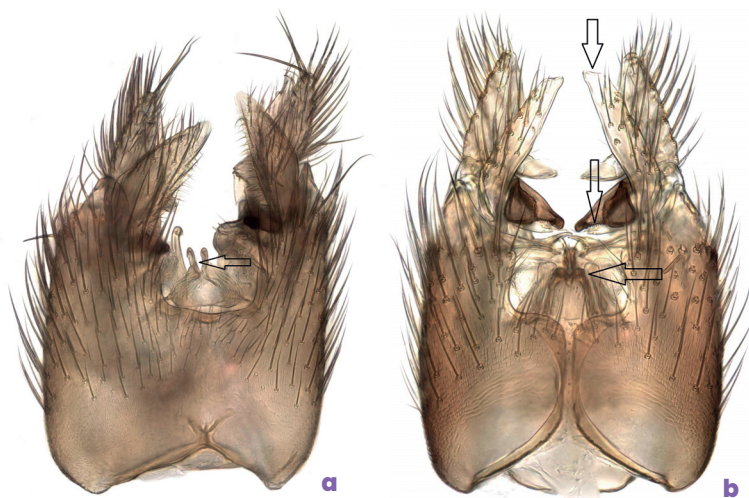


Figure 109. Ventral view of ♂ genitalia: (a) *Brevicornu arcticoides*; (b) *Brevicornu auriculatum*.

14. Hypandrial lobe (lower arrow, Fig. 109b) with a small medial cleft. Gonostylus with ventral lobe narrow and blunt-ended (upper arrow); medial lobe broad with shallow apical bifurcation (middle arrow). [Mesonotum grey with narrowly yellow side margins; tergites 2-4 yellow at sides and narrowly on hind margins; gonocoxites brown] *auriculatum* (Edwards, 1925) (p. 139)
- Hypandrial lobe with broad and shallowly concave apical margin (see above figures of *B. improvisum* and *B. canescens*). Gonostylus with medial lobe deeply bifurcate 15
15. Gonostylus with ventral lobe broader than dorsal lobe; medial lobe with internal branch hooked (arrowed). [Mesonotum grey, small yellow humeral area; tergites dark with small yellow apical triangles on tergites 2-3; gonocoxites brown] *improvisum* Zaitzev, 1992 (p. 141)



Figure 110. *Brevicornu improvisum*: (a) ventral view of ♂ genitalia; (b) gonostylus.

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- Gonostylus with ventral lobe narrower than dorsal lobe (upper arrow); medial lobe with a broad ventral branch (lower arrow). [Mesonotum variable, entirely dark or with three more or less fused dark stripes and broadly yellow on sides and humeral area; abdomen dark brown, with tergite 2 sometimes yellow laterally; genitalia yellow] *canescens* (Zetterstedt, 1852) (p. 139)

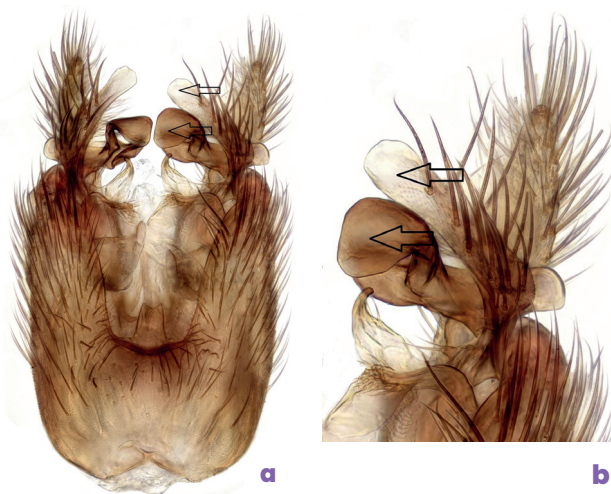


Figure 111. *Brevicornu canescens*:
(a) ventral view of ♂ genitalia;
(b) gonostylus.

16. Gonostylus with dorsal lobe not longer than ventral lobe, which has a subapical notch (arrowed). Hypandrial lobe deeply cleft medially (arrowed). [Mesonotum all brown or with small yellow humeral area; tergites 1-4 yellow at junctions between them; gonocoxites brown] *proximum* (Staeger, 1840) (p. 142)
- Gonostylus with dorsal lobe longer than ventral lobe, which lacks any notch 17

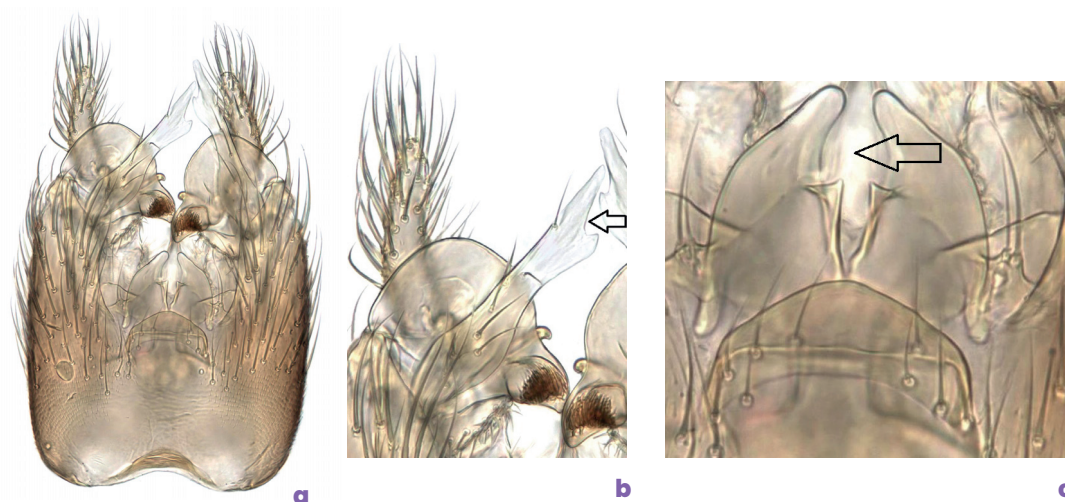


Figure 112. *Brevicornu proximum*: (a) ventral view of ♂ genitalia; (b) gonostylus; (c) hypandrial lobe.

17. Gonostylus with ventral lobe (arrowed in view of gonostylus of *B. parafennicum*) broad basally, tapered apically, bristles present close to apical part..... 18
- Gonostylus has ventral lobe with a broader bristly basal part and slender bare apical part (arrowed in ventral view of *B. verralli*) 21
18. Hypandrial lobe rounded apically (lower arrow). Gonostylus with medial lobe apically bearing a posteriorly reflexed blunt process (upper arrow). [Mesonotum with fused dark stripes, yellow on humeral area and sides; tergites 2-3 (-4) yellow laterally, extended dorsally on hind margins of 3-4; genitalia yellow] *fennicum* (Landrock, 1927) (p. 140)
- Hypandrial lobe concave or medially cleft apically. Gonostylus with medial lobe without such a posteriorly reflexed process 19

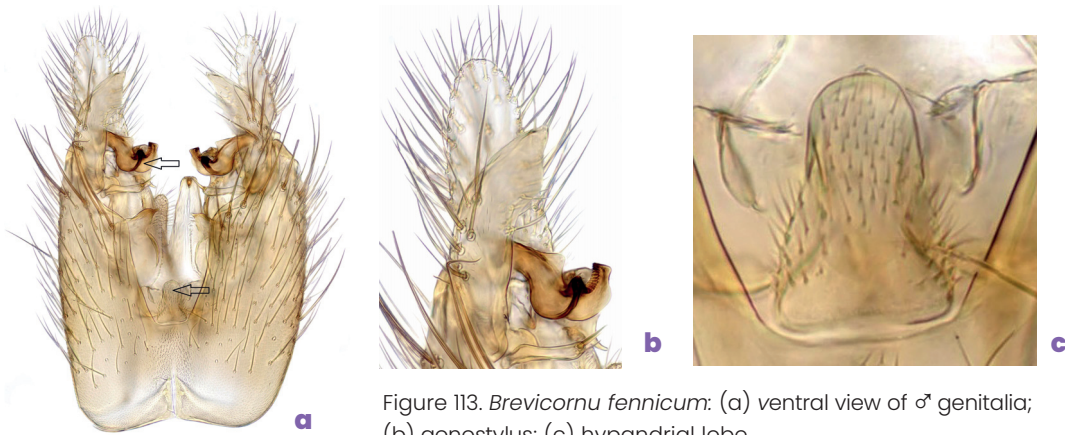


Figure 113. *Brevicornu fennicum*: (a) ventral view of ♂ genitalia; (b) gonostylus; (c) hypandrial lobe.

19. Gonostylus with ventral lobe (arrowed) about as long as dorsal lobe. [Mesonotum yellow with brown stripes; tergites 1-4 yellow laterally, extended dorsally on hind margins of 2-4; genitalia yellow] *parafennicum* Zaitzev, 1985 (p. 142)
- Gonostylus with ventral lobe much shorter than dorsal lobe 20

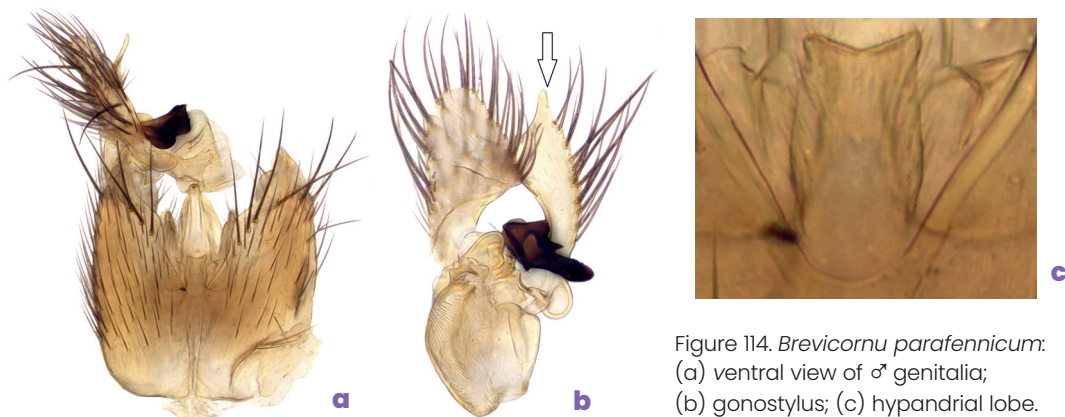


Figure 114. *Brevicornu parafennicum*: (a) ventral view of ♂ genitalia; (b) gonostylus; (c) hypandrial lobe.

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20. Gonostylus with medial lobe bearing a slender erect process (arrowed in internal view of gonostylus) near base, not bilobed apically. [Mesonotum all grey; tergites 2-3 narrowly yellow apically; gonocoxites brown] *canadense* Zaitzev, 1988 (p. 139)
- Gonostylus with medial lobe lacking such a process, but broadly bilobed apically (arrowed in ventral view) sp. near *arcticum* (Lundström, 1913) (p. 139)



21. Gonostylus with dorsal lobe bearing a group of dark spinules (arrowed) on inner side basally. Sternite 8 rectangular, only shallowly concave apically. Gonocoxites with hypandrial lobe apically concave (arrowed) on each side of a short bifurcate medial process. [Mesonotum all grey or with yellow sides and humeral area; tergites 1-4 (-base of 5) yellow laterally, dark dorsally; genitalia yellow] *verralli* (Edwards, 1925) (p. 143)
- Gonostylus without a group of dark spinules on inner side basally. Sternite 8 deeply concave apically with lateral edges produced 22

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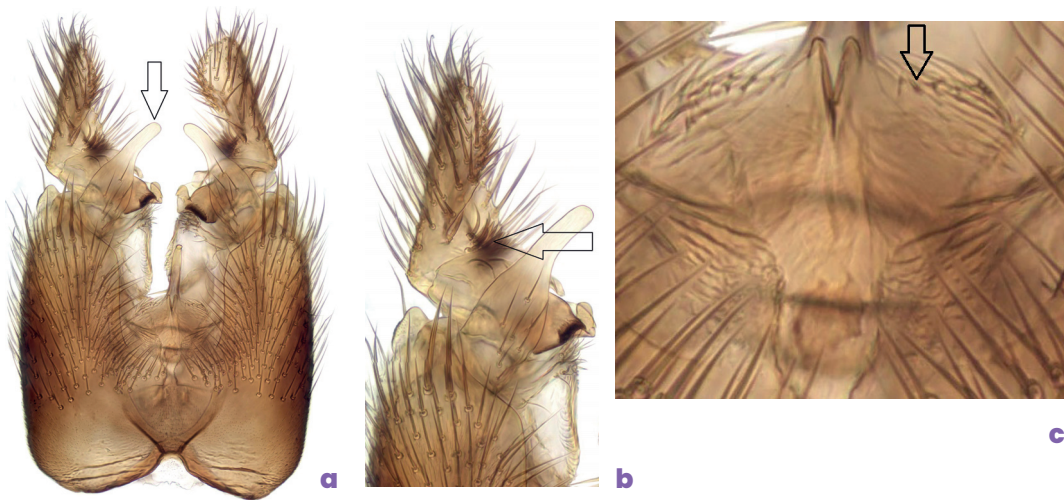


Figure 116. *Brevicornu verralli*. (a) ventral view of ♂ genitalia; (b) gonostylus; (c) hypandrial lobe.

22. Gonocoxites with hypandrial lobe elongate and deeply cleft medially (arrowed).
 [Mesonotum all grey or with yellow sides and humeral area; tergites 1-4 yellow with brown dorsal stripe; gonocoxites brownish yellow] *intermedium* (Santos Abreu, 1920) (p. 141)
- Gonocoxites with hypandrial lobe short and narrowly cleft medially (arrowed in ventral view of each species and detail shown in enlarged views of hypandrial lobe) 23

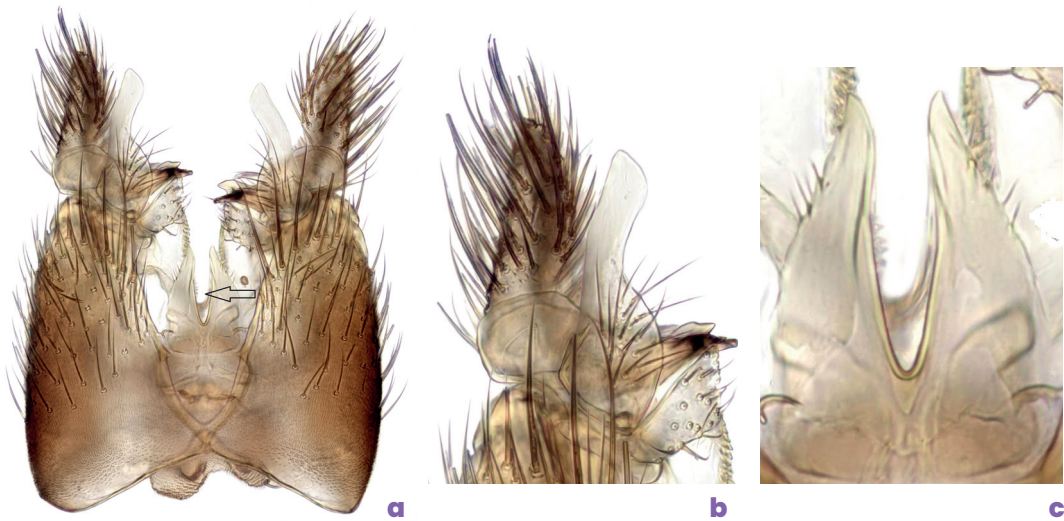


Figure 117. (a) *Brevicornu intermedium*: (a) ventral view of ♂ genitalia; (b) gonostylus; (c) hypandrial lobe.

23. Gonocoxites with hypandrial lobe apically rounded with medial cleft occupying at least half its length. [Mesonotum all grey or with yellow sides and humeral area; tergites 1-4 (-5) yellow laterally, extended dorsally on 2-4; genitalia yellow] *fissicauda* (Lundström, 1911) (p. 140)
- Gonocoxites with hypandrial lobe apically with a pair of short pointed processes with narrow cleft between them extending basally for less than half its length (*B. verralli* is similar but has the apical processes blunt) *subfissicauda* Zaitzev, 1985 (p. 143)

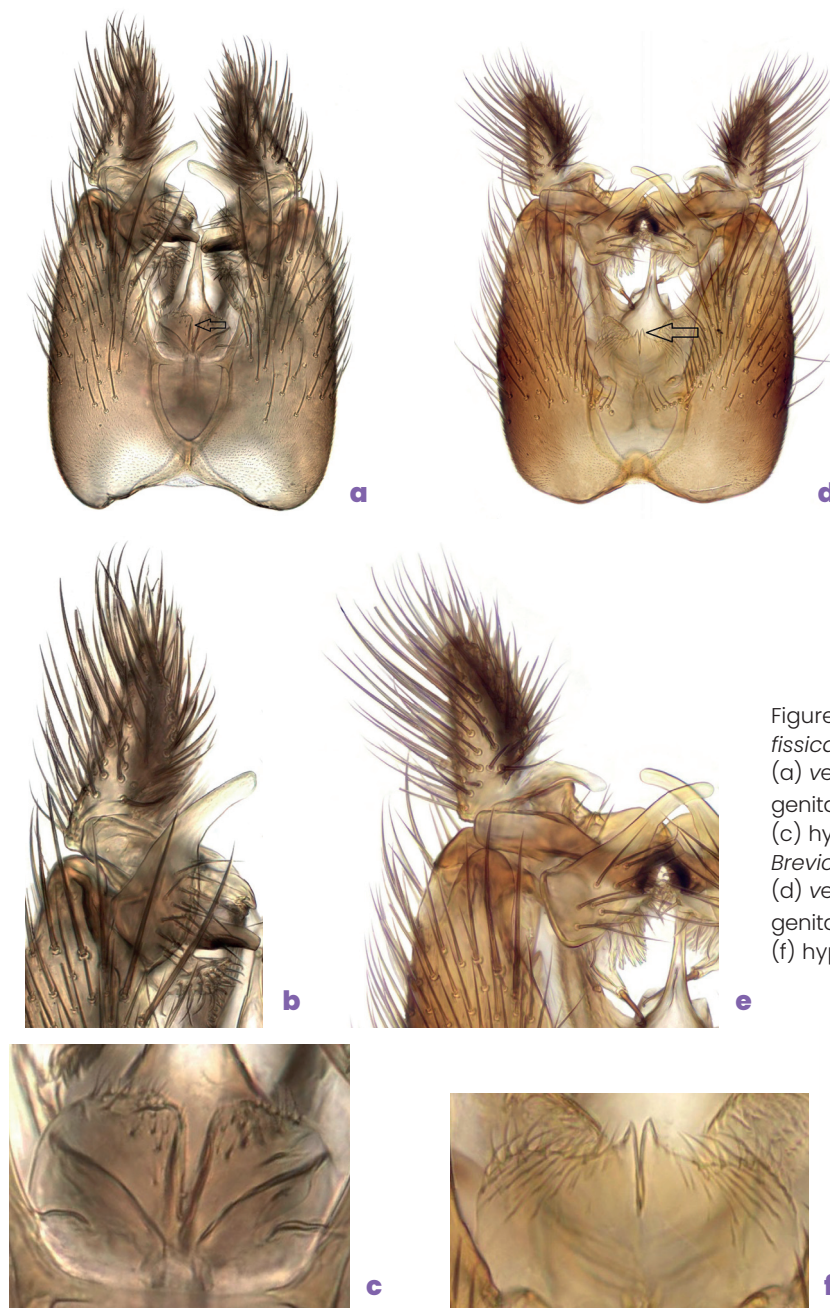


Figure 118. *Brevicornu fissicauda*.

(a) ventral view of ♂ genitalia; (b) gonostylus; (c) hypandrial lobe.

Brevicornu subfissicauda.
(d) ventral view of ♂ genitalia; (e) gonostylus; (f) hypandrial lobe.

Species notes

Brevicornu arcticoides Caspers, 1985

Distribution. Only five English sites are known: Sandwell Valley, Staffs (vii.1988, M. Bloxham); Sutton Broad, Norfolk (vi-ix.1989 and 1990, A. Foster & D. Procter); Gibraltar Point, Lincs (vi and ix.2016, D. Sheppard); Raithby Beck Wood, Lincs (vii-ix.2016 and 2017, D. Sheppard); Wolla Bank Pit, Lincs (vii-ix.2019, D. Miller). Widespread in W and N Europe.

Habitat. Wet woodland.

Biology. Unknown.

Brevicornu sp. near *arcticum*

Distribution. For long known in the British Isles only from a single male, found on 10.vii.1971 at Powerscourt Deer Park, Co Wicklow (Chandler 1977, as *B. arcticum*) until another was found at the Warburg Reserve, Oxfordshire, on 6.viii.2016 (I. Perry) (Chandler 2018). Scarce in C and N Europe.

Habitat. Unclear. The English site is mixed woodland on chalk.

Biology. Unknown.

Brevicornu auriculatum (Edwards, 1925)

Distribution. Locally common throughout Britain, though Scottish records are only from the eastern half of the country; widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

Brevicornu canadense Zaitzev, 1988

Distribution. Known in Britain from two males, found at New Marston Meadows SSSI, Oxfordshire (8.xii.2011, J. Webb) (Chandler 2013, as *B. sp. near arcticum*) and Crickley Hill, Gloucs (viii-ix.2019, K. Alexander). Holarctic, scarce in Europe with records from Norway and Switzerland.

Habitat. The Oxfordshire specimen was found flying near the field blewit fungus *Lepista personata* in a wet meadow. Crickley Hill is dry woodland on limestone.

Biology. Unknown.

Brevicornu canescens (Zetterstedt, 1852)

Distribution. Only known in Britain from two old records from the Spey valley in Scotland: Nethy Bridge (vii.1906, J.J.F.X. King) and Aviemore (31.v.1913, J.W. Yerbury). Palaearctic, widespread in Europe.

Habitat. The habitat of the British specimens was not recorded, but it was probably pine or birch woodland. The author found it in montane beech woodland in the Pyrenees.

Biology. Unknown.

***Brevicornu fennicum* (Landrock, 1927)**

Distribution. Poorly known with only eight recorded sites in six hectads of the Scottish Highlands, mostly in and near the Spey valley: Grantown, Spey Bridge (21.ix.1978, I. McLean), Dulicht Wood (12.ix.2004, I. Perry), Loch Garten (3.vi.2014, R. Morris), Sluggan (2013) and three sites in viii–ix.2016 (Rothiemurchus, Loch Morlich, Atnaglander), also E. Ross (Braelangwell, 29.vi and 4.ix.1976, A. Stubbs). Widespread in C and N Europe.

Habitat. The Braelangwell records were from pine woodland, while those from the Grantown area were from broad-leaved woodland including aspen.

Biology. Unknown.

***Brevicornu fissicauda* (Lundström, 1911)**

Distribution. Common throughout Britain; widespread in the east side of Ireland (four sites in Cos Tyrone, Wicklow and Kildare, most recent in 1986), also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Brevicornu foliatum* (Edwards, 1925)**

Distribution. A very local and scattered distribution (21 hectads, 10 of them in Scotland), with records from S England, East Anglia, Wales, Cumbria and the Scottish Highlands (mainly the Spey valley but also Migdale Wood, Sutherland and the Rannoch area). One Irish record (Lisdoonvarna, Co Clare, 22.v.1970, Chandler). Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Brevicornu fuscipenne* (Staeger, 1840)**

Distribution. Common throughout Britain; widespread in Ireland, also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Brevicornu glandis* Laštovka & Matile, 1974**

Distribution. Most records are from the 1987–1989 Oxfordshire and 1988–1990 East Anglian wetland surveys, with two Welsh records (in same hectad) from Anglesey in 1988. In Ireland several records from the Burren grikes, Co Clare (ix.1991, S.V. Green). It is evidently an overlooked species with the only more recent records from Gozzard's Ford Fen, Oxfordshire (viii–xii.2002, S.J. Gregory), Sutton Bingham Reservoir, Somerset (13.vii.2011, D.J. Gibbs) and Snipe Dales, Lincolnshire (vi.2016, D.A. Sheppard). Palaearctic, widespread in Europe.

Habitat. A range of wetland habitats, including carr and fens.

Biology. Unknown.

***Brevicornu griseicolle* (Staeger, 1840)**

Distribution. Very common throughout Britain and Ireland, also in Isle of Man and Jersey. Palaearctic, widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Woodland.

Biology. No British records. Other records: German rearings from terrestrial agarics: *Cortinarius elatior* (Plassmann 1971), *Hebeloma crustuliniforme*, *Inocybe* sp. (Eisfelder 1956). Jakovlev (2011) considered that these records required confirmation.

***Brevicornu griseolum* (Zetterstedt, 1852)**

Distribution. Common in the Scottish Highlands, also in Orkney, frequent in N England and N Wales, with a scattered distribution in the south. Three Irish records (Glendalough, Co Wicklow, 1971; Lismore Wood, Co Waterford, 2010; Breen Wood, Co Antrim, 2018). Palaearctic, widespread in Europe.

Habitat. Wet woodland.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Brevicornu improvisum* Zaitzev, 1992**

Distribution. Only known as British from one male from the Birks of Aberfeldy, Perthshire on 23.v.2015 (I. Perry) (Chandler 2016). Holarctic, widespread in Europe.

Habitat. The site is broad-leaved woodland in a gorge, with a fast-flowing stream.

Biology. Unknown.

***Brevicornu intermedium* (Santos Abreu, 1920)**

Distribution. Frequent in S England and Wales, with two Scottish records (Caddam Wood, Angus, 22.x.1993; Lynachlaggan, 2013–2017), not recorded from Ireland. Palaearctic, widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Woodland.

Biology. Unknown.

***Brevicornu kingi* (Edwards, 1925)**

Distribution. Widespread but uncommon in the west of Scotland and Skye, with 15 records of which the most easterly are Morrone Birkwood (14.vii.1991) and Canisbay, Caithness (1990), and the most recent are from Dundreggan (2010–2012), Loch Etive and Glen Carron (2019); also one record for Wales (Migneint, vi–x.1988, Holmes, Boyce & Reed). Widespread in Europe.

Habitat. Scottish records are from pine forest and open moorland; the Welsh record was from a blanket bog.

Biology. Unknown.

***Brevicornu nigrofusum* (Lundström, 1909)**

Distribution. Scattered throughout Britain, with most records from the Scottish Highlands; also recorded from Mingulay in the Western Isles. Probably overlooked because of

occurrence in under-recorded habitats. Irish records are from St John's Wood, Co Roscommon in 2010. Widespread in Europe.

Habitat. Wet woodland, wetlands and open moorland.

Biology. Unknown.

***Brevicornu parafennicum* Zaitzev in Zaitzev & Polevoi, 1995**

Distribution. One male was found at Dundreggan in a Liverpool Museum Malaise trap sample from the period 21.vii–25.viii.2011, in a new plantation area on the banks of the river Moriston. Scarce in N Europe.

Habitat. The trap was set in rough pasture, planted with saplings of aspen, birch, rowan and wild roses in 2009/10, within a deer exclusion fence, bordered by sheep-grazed meadows, a clear-felled area of dead and moribund pines with some mature pines and larches still standing, and herb-rich riverbanks (Chandler 2013).

Biology. Unknown.

***Brevicornu proximum* (Staeger, 1840)**

Distribution. Locally frequent in England and Wales, with a few sites in the Scottish Highlands, and several records in N Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Brevicornu rosmellitum* Chandler, 2001**

Distribution. Only known in Britain from the type specimens from Waterperry Wood, Oxfordshire (12.x.1968, J. Brock). Holarctic, in Europe only otherwise recorded from Switzerland and Norway.

Habitat. The British record was from broad-leaved woodland.

Biology. Unknown.

***Brevicornu ruficorne* (Meigen, 1838)**

Distribution. Rather local with most records from S England and S Wales, otherwise scattered records on the east side of England and from the eastern Highlands (7 hectads); widespread near the coast in Ireland, also in Isle of Man. Widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Brevicornu serenum* (Winnertz, 1864)**

Distribution. Occurs throughout Britain but with a disjunct distribution; mostly recorded from the Scottish Highlands (17 hectads), then 30 hectads in Wales and S England north to Norfolk. In Ireland, two records from N Ireland (Co Tyrone) and two from Co Wicklow. Widespread in Europe.

Habitat. Mainly broad-leaved woodland, also in pine woods in Scotland.

Biology. No British records. Other records: from under moss-covered bark of a rotting

willow trunk and from under bark bearing the resupinate polypore *Phellinopsis conchata* (Jakovlev 2011, Finland).

***Brevicornu sericoma* (Meigen, 1830)**

Distribution. Very common throughout Britain and Ireland, also in Shetland, Foula and Isle of Man. Holarctic, widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Woodland and open habitats.

Biology. **No British records.** **Other records:** Reared from the wood-encrusting fungus *Chondrostereum purpureum* on a birch trunk (Jakovlev 2011). A record from *Amanita rubescens* (Falcoz 1926, France) was considered by Jakovlev to require confirmation. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Brevicornu subfissicauda* Zaitzev, 1985**

Distribution. Only known as British from four widely scattered records: Thompson Common, Norfolk, 29.v.2000 (I. Perry); Altnaglander, Banffshire, gulley in birch woodland, 2.vi.2014 (A.E. Stubbs) (Chandler 2015a); Poynings, West Sussex, 23.viii.2016 (D. Gibbs); Ausewell Wood, Devon, 19.ix.2020 (R. Wolton). Holarctic, widespread but scarce in Europe.

Habitat. Woodland.

Biology. Unknown.

***Brevicornu verralli* (Edwards, 1925)**

Distribution. Frequent throughout Britain; a few scattered records from Ireland. Palearctic, widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Woodland.

Biology. Unknown

Genus *Cordyla* Meigen

Small mainly black or brownish yellow gnats, sometimes with yellow markings on abdomen; legs mainly yellow, with dark markings sometimes on coxae and femora. Antepenultimate segment of palpi enlarged, especially in male. Antennae short with a diminished number of flagellomeres, 13 or less in male, 10 or less in female. Mesonotum with short setulae and scattered longer decumbent bristles (as in *Brevicornu*, in most species; these are absent in *C. fusca* which only has a uniform covering of fine pale setulae). Lower part of anepimeron with a sharply delimited black spot near front margin. Anepisternum with strong bristles near hind margin and scattered bristles dorsally. Two pairs of strong scutellars. Stem of median fork at least twice as long as crossvein r-m. Veins of both forks bare; some fork veins may be abbreviated. False vein reaches to level of about half of posterior fork. CuP weak and not exceeding base of posterior fork. Hind tibia without posterior bristles, hind tibial spurs longer than half length of tarsomere 1. Wing length 1.5–3.5 mm.

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Male genitalia laterally compressed, the gonostylus comprising three discrete lobes. Female cercus two-segmented; tergite 7 often with specific structure to its hind margin.

There are 16 described European species but several others have been recognised in a revision under preparation by Olavi Kurina (*pers. comm.*), including one of the 13 British species. Kurina (2001) gave an introductory account of this revision. All of the 12 described British species are among the 14 species keyed by Zaitzev (2003) but *C. pusilla* Edwards is included under the synonymous name *C. sixi* (Barendrecht, 1938). Zaitzev also gave erroneous numbers of flagellomeres for some species (e.g. 10 instead of 11 for *C. parvipalpis*). The key is mainly based on male characters; females of some species can be identified from structure of the ovipositor and form of the apical margin of tergite 7, but they have not been associated for all species.



Figure 119. (a) *Cordyla crassicornis* ♂. (b) *Cordyla brevicornis* ♂.

Key to *Cordyla* Meigen

1. Vein M_2 reaching wing margin. Stem of median fork 4 x as long as crossvein r-m. Male with 11 flagellomeres. Mainly dark-bodied; tergites 2-4 may have yellow patches. Gonostylus with medial lobe (arrowed) narrow and pointed, lacking the lateral projection found in *C. fissa*, which has a similar structure *crassicornis* Meigen, 1818 (p. 151)
- Vein M_2 not reaching wing margin (upper arrow in figure of *C. flaviceps*) 2



Figure 120. *Cordyla crassicornis*: (a) male head, dorsal view; (b) lateral view of ♂ genitalia.

2. Male with antepenultimate palpomere (arrowed) only slightly enlarged, and 11 flagellomeres. Base of posterior fork under that of median fork. Mainly dark-bodied; tergites 1-3 may be yellow laterally *parvipalpis* Edwards, 1925 (p. 153)
- Male with antepenultimate palpomere strongly enlarged 3

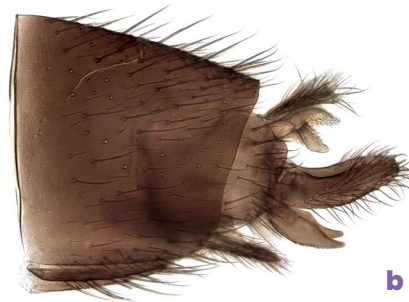
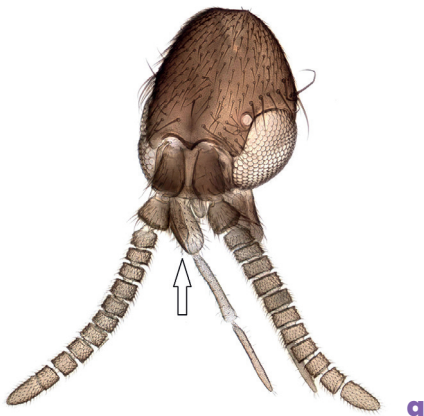


Figure 121. *Cordyla parvipalpis*: (a) male head, dorsal view; (b) lateral view of ♂ genitalia.

- 3 Enlarged palpomere yellow or yellowish brown. Thorax yellowish brown; tergites 1-3 mainly yellow 4
- Enlarged palpomere black or dark brown 5

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4. Male with 11 flagellomeres. Gonostylus with medial lobe pointed apically (arrowed). Base of posterior fork near level of base of median fork (arrowed) *fasciata* Meigen, 1830 (p. 151)
- Male with 12 flagellomeres. Gonostylus with medial lobe rounded apically with a preapical notch (arrowed). Base of posterior fork distinctly beyond base of median fork (arrowed) *flaviceps* (Meigen, 1840) (p. 151)

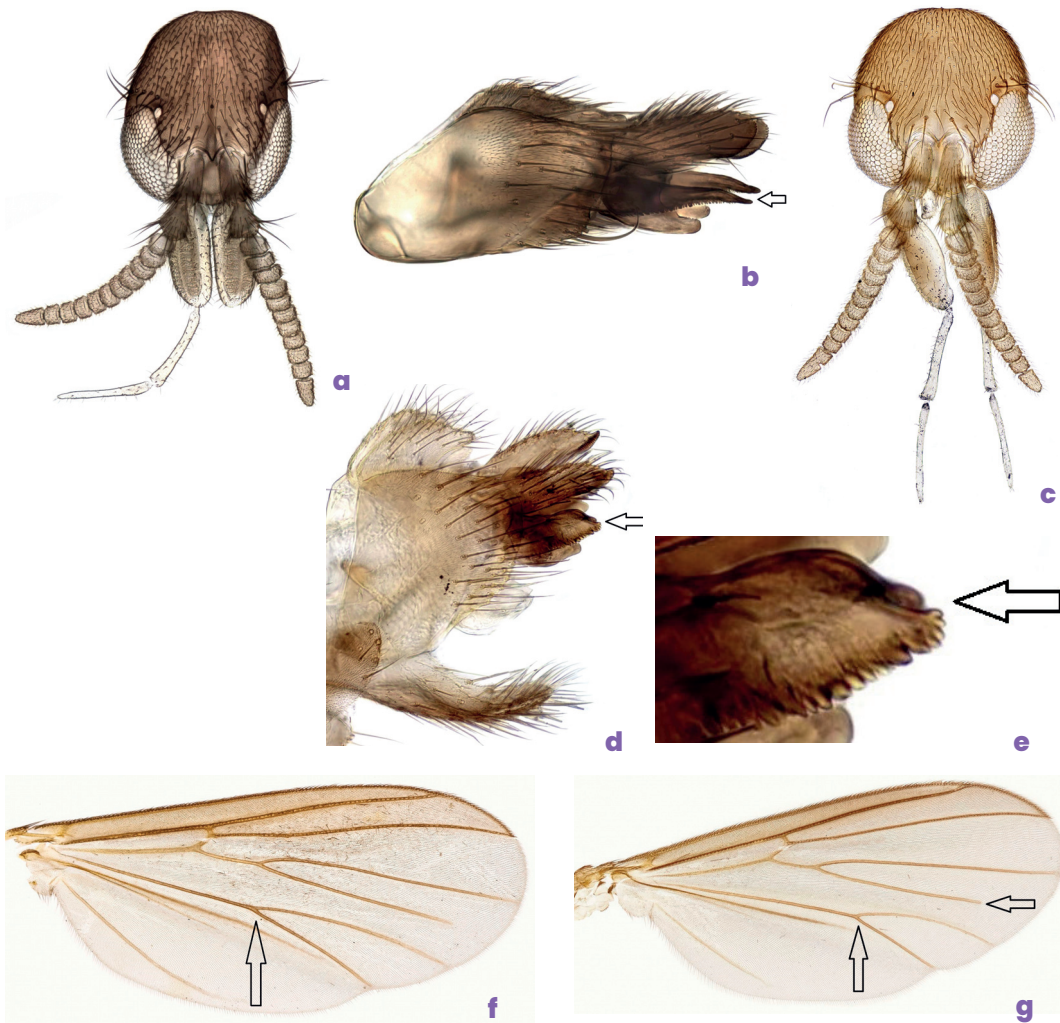


Figure 122. *Cordyla fasciata*: (a) male head; (b) lateral view of ♂ genitalia. *Cordyla flaviceps*: (c) male head; (d) lateral view of ♂ genitalia, notch in medial lobe arrowed; (e) notch in medial lobe. Wing of: (f) *Cordyla fasciata*; (g) *Cordyla flaviceps*.

5. Mesonotum shining black, abdomen all black 6
- Mesonotum not shining 7

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6. Male with 12 flagellomeres. Stem of median fork not more than 2.5 x long as crossvein r-m. Base of posterior fork slightly before base of median fork. Gonostylus with medial lobe bent downwards at tip (left and right medial lobes both arrowed) *fusca* Meigen, 1804 (p. 152)
- Male with 13 flagellomeres. Stem of median fork 4-5 x long as crossvein r-m (as in most other species). Base of posterior fork below or slightly beyond base of median fork. Gonostylus with medial lobe (arrowed) enlarged but not bent downwards apically *nitidula* Edwards, 1925 (p. 153)

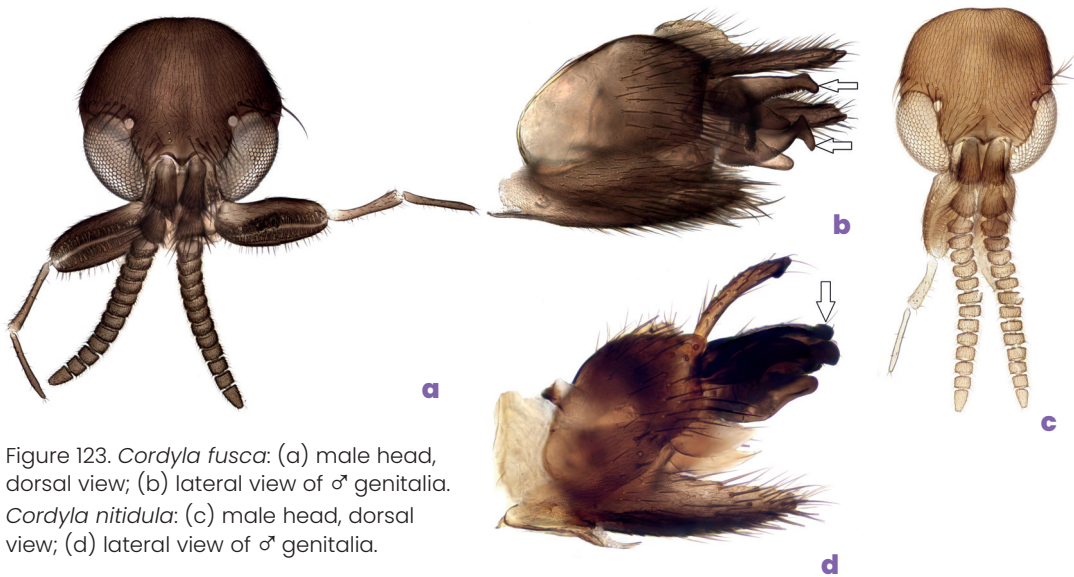


Figure 123. *Cordyla fusca*: (a) male head, dorsal view; (b) lateral view of ♂ genitalia. *Cordyla nitidula*: (c) male head, dorsal view; (d) lateral view of ♂ genitalia.

7. Male with 13 flagellomeres. Usually a larger species with mesonotum yellowish brown, tergites 1-3 (-4) mainly yellow *semiflava* (Staeger, 1840) (p. 153)
- Male with 10-12 flagellomeres. Mostly small dark species (*C. insons* is paler) 8

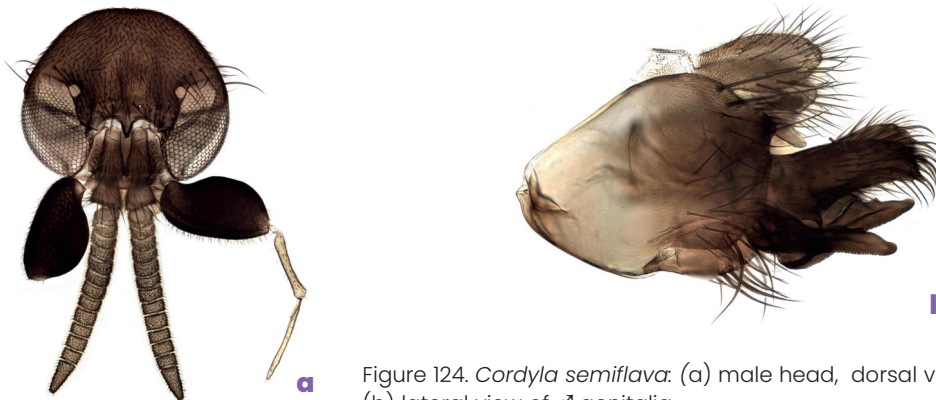


Figure 124. *Cordyla semiflava*: (a) male head, dorsal view; (b) lateral view of ♂ genitalia.

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8. Male with 10 flagellomeres 9
- Male with 11 or 12 flagellomeres 10
9. Gonostylus with medial lobe broad and blunt apically (in lateral view) (arrowed)
..... *pusilla* Edwards, 1925 (p. 153)
- Gonostylus with medial lobe narrowed apically (in lateral view) (arrowed)
..... *brevicornis* (Staeger, 1840) (p. 150)

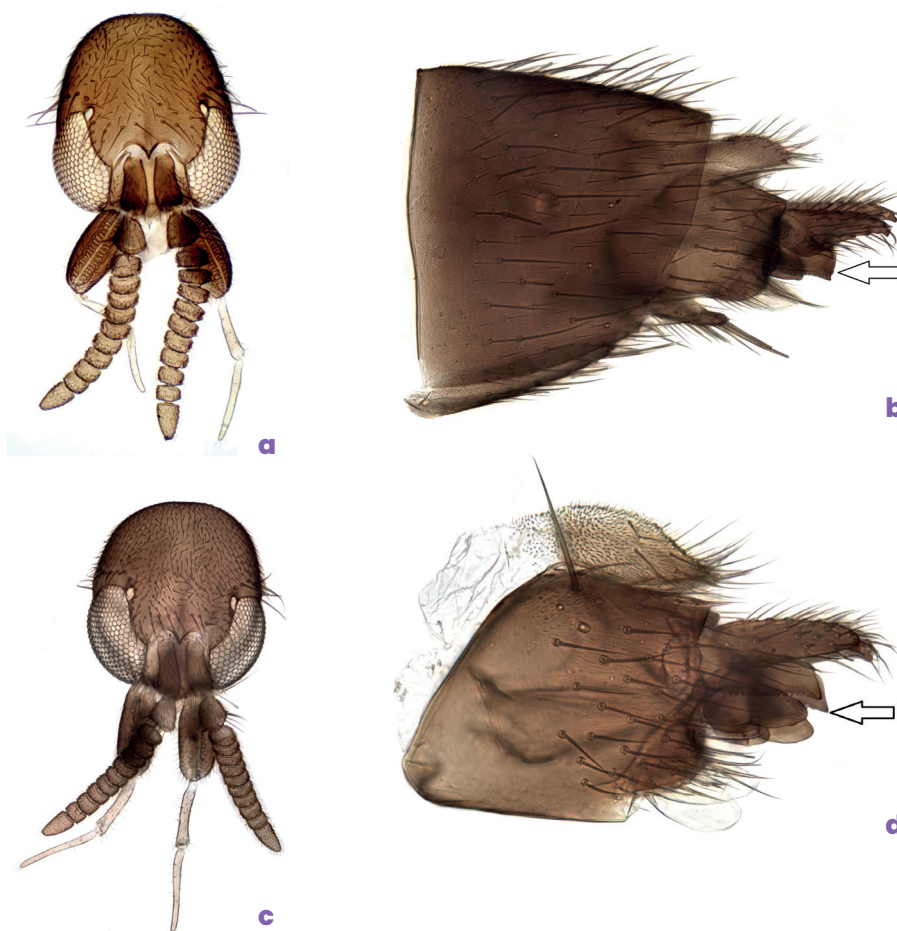


Figure 125. *Cordyla pusilla*: (a) male head, dorsal view; (b) lateral view of ♂ genitalia.
Cordyla brevicornis: (c) male head, dorsal view; (d) lateral view of ♂ genitalia.

- 1.0 Male with 11 flagellomeres 11
- Male with 12 flagellomeres. Body mostly dark 12

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11. Mid tibia without dorsal bristles; only one row of bristles (anterior) present. Mainly brownish with tergites 1-4 partly yellow, most evident at junctions between tergites. Male genitalia close to *C. murina* *insons* Laštovka & Matile, 1974 (p. 152)
- Mid tibia with two rows of bristles (anterior and dorsal) (as in all other British species). Mainly dark-bodied or partly yellow on tergites 1-3. Male genitalia similar to *C. crassicornis*, but medial lobe of gonostylus longer with a short lateral process (arrowed)..... *fissa* Edwards, 1925 (p. 151)



Figure 126. *Cordyla insons*: (a) male head, dorsal view; (b) lateral view of ♂ genitalia.
Cordyla fissa: (c) male head, dorsal view; (d) lateral view of ♂ genitalia.

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12. Enlarged palpomere large, about as long as eye height. Ventral lobe of gonostylus pointed (arrowed) *murina* Winnertz, 1864 (p. 152)
- Enlarged palpomere (arrowed) smaller, distinctly shorter than height of eye. Ventral lobe of gonostylus blunt ended (arrowed) sp. near *murina* Kurina MS (p. 152)

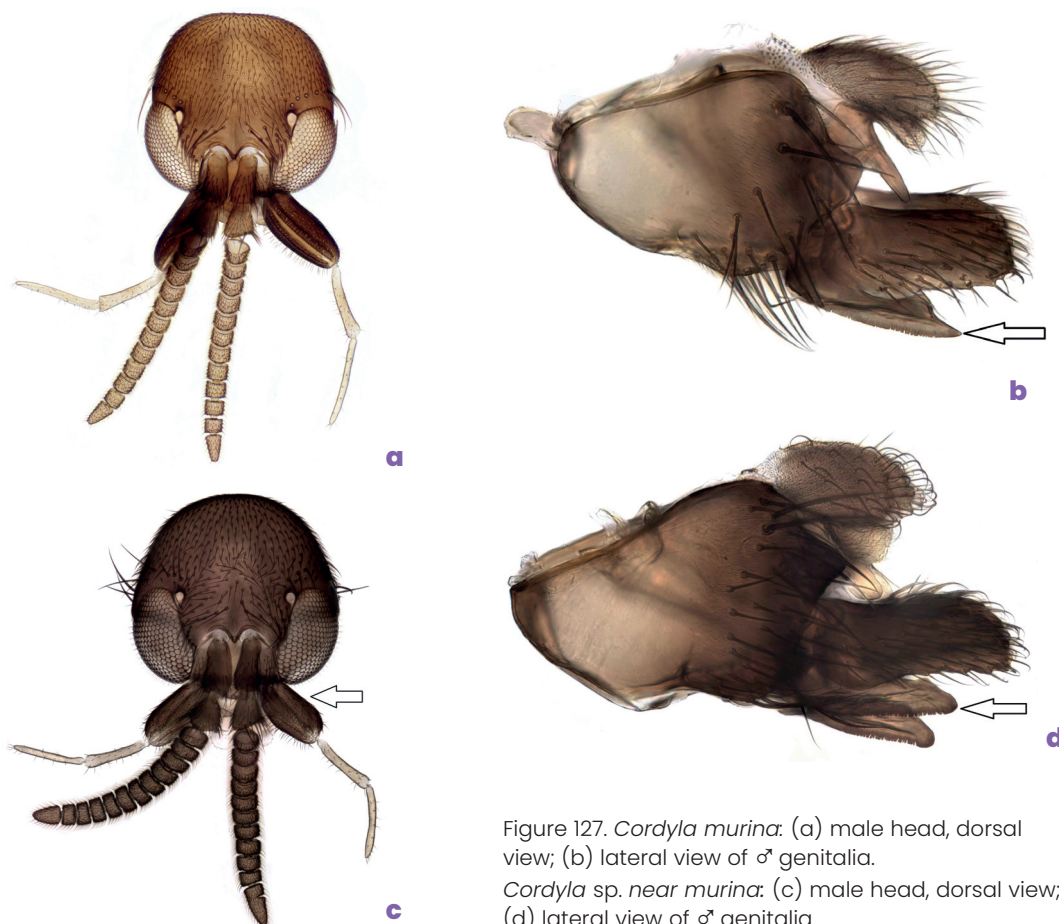


Figure 127. *Cordyla murina*: (a) male head, dorsal view; (b) lateral view of ♂ genitalia.
Cordyla sp. near *murina*: (c) male head, dorsal view;
 (d) lateral view of ♂ genitalia.

Species notes

Cordyla brevicornis (Staeger, 1840)

Distribution. Common throughout Britain; widespread in Ireland, also in Jersey. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Polyphagous in terrestrial and saproxylic fungi, with records from several genera of agarics and boletes, but *Russula* (18 species) and *Amanita* (9 species) predominate.

British records: *Boletus edulis*, *Amanita citrina*, *A. muscaria*, *A. rubescens*, *A. vaginata*, *Russula chloroides*, *R. cyanoxantha*, *R. ionochlora* (Edwards 1925, Chandler 1993a, Madwar 1937, Trifourkis 1977). **Other records:** *Amanita ceciliae*, *A. excelsa*, *A. pantherina*, *A. gemmata*,

A. rubescens, *A. verna*, *A. virosa*, *Armillaria mellea*, *Boletus pinophilus*, *B. reticulatus*, *Cortinarius caperatus*, *C. hinnuleus*, *C. trivialis*, *Hemileccinum impolitum*, *Macrolepiota excoriata*, *Lactarius glyciosmus*, *L. torminosus*, *Pholiota vernalis*, *Russula aeruginea*, *R. atropurpurea*, *R. aurora*, *R. cyanoxantha*, *R. decolorans*, *R. emetica*, *R. foetens*, *R. grisea*, *R. nauseosa*, *R. ochroleuca*, *R. paludosa*, *R. pectinata*, *R. sanguinea*, *R. sardonis*, *R. vesca* (Dely-Draskovits 1974, Eisfelder 1955 and 1956, Kurina 1991 and 1998, Landrock 1940, Plassmann 1971, Ribeiro 1990, Ševčík 2006 and 2010, and Russian records cited by Jakovlev 1994). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Cordyla crassicornis* Meigen, 1818**

Distribution. Common throughout Britain and Ireland, also in Isle of Man. Palaearctic, widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Woodland; adults are often present on tree trunks.

Biology. Develops in Russulaceae. **British records:** *Russula azurea* (Edwards 1925). **Other records:** *Lactarius deliciosus* (Russian record cited by Jakovlev 1994), *Russula emetica* (Plassmann 1971).

***Cordyla fasciata* Meigen, 1830**

Distribution. Widespread in Britain and Ireland, although apparently absent from East Anglia. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Develops mainly in Russulaceae; other recorded hosts are species of *Boletus*, *Suillus* and *Gymnopus*. **British records:** *Russula nigricans* (Edwards 1925, Trifourkis 1977). **Other records:** *Boletus edulis*, *B. pinophilus*, *Gymnopus dryophilus*, *Lactarius acerrimus*, *L. deliciosus*, *L. pallidus*, *L. rufus*, *L. torminosus*, *L. zonarius*, *Lactifluus piperatus*, *L. vellereus*, *Russula adusta*, *R. cyanoxantha*, *R. densifolia*, *R. fellea*, *R. foetens*, *R. fragilis*, *R. paludosa*, *R. pectinata*, *Suillus granulatus* (Canzanelli 1941, Dely-Draskovits 1974, Eisfelder 1955, Falcoz 1926, Hackman and Meinander 1979, Kurina 1991, Plassmann 1971, and Russian records cited by Jakovlev 1994). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Cordyla fissa* Edwards, 1925**

Distribution. Common throughout Britain and Ireland, also in Isle of Man. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. **No British records.** **Other records:** reared in Russia from the bolete *Suillus luteus* (Jakovlev 1994, his rearings from Karelia).

***Cordyla flaviceps* (Staeger, 1840)**

Distribution. Frequent in most of Britain, though becoming more local in Scotland; widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland

Biology. Develops in terrestrial fungi, mainly *Russula* and *Lactarius* spp, but also recorded from *Hygrophorus* and *Leccinum*. **British records:** *Russula* spp (Madwar 1937), *Russula*

fellea, *R. ochroleuca* (J. Webb, Trifourkis 1977). **Other records:** *Hygrophorus eburneus*, *Lactarius chrysorrheus*, *L. deliciosus*, *Leccinum vulpinum*, *Russula aurea*, *R. aeruginea*, *R. claroflava*, *R. cyanoxantha*, *R. delica*, *R. emetica*, *R. fellea*, *R. nauseosa*, *R. paludosa*, *R. pectinata*, *R. sanguinaria*, *R. velenovskyi*, *R. vinosa* (Dely-Draskovits 1974, Hackman and Meinander 1979, Kurina 1991, Plassmann 1971, and Russian records cited by Jakovlev 1994). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Cordyla fusca* Meigen, 1804**

Distribution. Frequent throughout Britain; three records from N Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Develops in terrestrial fungi, mainly *Russula* (16 species), but also recorded from *Lactarius deliciosus*, *Amanita*, *Boletus* and *Leccinum*, and one record from a saproxylic agaric *Hypholoma fasciculare*. **British records:** *Russula nigricans*, *R. chloroides*, *R. cyanoxantha* (Edwards 1925), *R. atropurpurea* (Chandler 1993b), *R. ?parazurea* (J. Webb), *R. fellea* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Amanita citrina*, *A. gemmata*, *Boletus edulis*, *Hypholoma fasciculare*, *Lactarius deliciosus*, *Leccinum scabrum*, *Russula adusta*, *R. aeruginea*, *R. albonigra*, *R. atropurpurea*, *R. claroflava*, *R. densifolia*, *R. delica*, *R. emetica*, *R. fellea*, *R. foetens*, *R. paludosa*, *R. torulosa*, *R. vinosa* (Dely-Draskovits 1974, Kurina 1991, Ribeiro 1990, Ševčík 2006 and 2010, and Russian records cited by Jakovlev 1994).

***Cordyla insons* Laštovka & Matile, 1974**

Distribution. Most records are from the Scottish Highlands (14 hectads), with a few recent scattered records from England (7 hectads); it was first recognised in Britain in the 1980s and may have been confused with *C. murina*, so its status is uncertain. Palaearctic, widespread in Europe, also in N Africa.

Habitat. Woodland, most British sites being Caledonian pine forest.

Biology. Unknown.

***Cordyla murina* Winnertz, 1864**

Distribution. Common throughout Britain and Ireland; earlier confused with an undescribed species (here treated as sp. near *murina*) and with *C. insons*. Palaearctic, widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. Most rearings are from terrestrial agarics (*Lactarius*, *Porpoloma*) and boletes (*Imperator*, *Gomphidius*, *Suillus*), but also from *Scleroderma* and *Asterodon*. **No British records.** **Other records:** *Imperator torosus*, *Porpoloma macrorhizum* (Dely-Draskovits 1974, Hungary), *Lactarius torminosus* (Eisfelder 1955, Germany), *Scleroderma verrucosum* (Falcoz 1926, France), *Gomphidius glutinosus*, *Suillus luteus* (Ševčík 2006, Slovakia), *Asterodon ferruginosus* (on a decayed moss-covered spruce log; Jakovlev 2011, Finland).

***Cordyla* sp. near *murina* (Kurina in prep.)**

Note. This is the species figured as *murina* by Edwards (1925).

Distribution. Probably common throughout Britain, though less recorded than the closely related *C. murina*; widespread in Ireland. It is anticipated that it will be

described as new in a proposed revision of the genus by Olavi Kurina. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown. Some rearing records attributed to *C. murina* may refer to this species. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Cordyla nitidula* Edwards, 1925**

Distribution. Mostly old scattered records (8 hectads) in S England and Wales, with one old and two recent Scottish records (Bonhill, J.R. Malloch; Granish, viii-ix.2011, M. Townsend; Linn of Tummel, 9.ix.2014, I. Perry), and two Irish records (Burren ix.1991, S.V. Green; Crom Castle Estate, vi-vii.1992, A.P. Foster). It appears to have been recorded more through rearing, so adults are apparently elusive and easily overlooked among other members of the genus. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Develops in terrestrial fungi, with most rearing records from *Russula* (17 species), with a few from *Lactarius*, *Boletus* and *Suillus*. **British records:** *Russula chloroides*, *R. ochroleuca*, *R. risigallina* (Buxton 1960, Edwards 1925). **Other records:** *Boletus edulis*, *Lactarius* sp., *Russula aeruginea*, *R. amoenicolor*, *R. atropurpurea*, *R. cyanoxantha*, *R. ionochlora*, *R. olivacea*, *R. sanguinaria*, *R. sanguinea*, *R. torulosa*, *R. velenovskyi*, *R. vesca*, *R. violeipes*, *R. virescens*, *R. xerampelina*, *Suillus variegatus* (Dely-Draskovits 1974, Eisfelder 1955, Ribeiro 1990, Ševčík 2006 and 2010, and Russian records cited by Jakovlev 1994).

***Cordyla parvipalpis* Edwards, 1925**

Distribution. Frequent in the Scottish Highlands, also with a cluster of records in N England, and a few from S England and East Anglia. Palaearctic, widespread in Europe.

Habitat. Woodland, heathland and moorland.

Biology. **No British records.** **Other records:** reared from a *Russula* sp. (Sakharova 1977, cited in Jakovlev 1994; Russia), a decayed pine log bearing *Antrodia* species and from emergence trap over decayed pine twigs bearing fungal mycelium (Jakovlev 2011, Russian Karelia).

***Cordyla pusilla* Edwards, 1925**

Distribution. Frequent throughout Britain, with a recent increase in records; widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. **No British records.** **Other records:** *Amanita citrina*, *Boletus pinophilus* (as *pinicola*) (Rimšaite 2000 (as *C. sixi*), Lithuania).

***Cordyla semiflava* (Staeger, 1840)**

Distribution. Frequent throughout Britain, commonest in the south and in the Scottish Highlands; widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland and heathland.

Biology. Unknown.

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Genus *Exechia* Winnertz

Slender gnats, mainly dark or with variously developed yellow markings, pale abdominal markings when present usually broadest towards bases of tergites, legs yellow. Clypeus short, rounded or heart-shaped. Mesonotum with bristles usually well-developed centrally in two dorsocentral rows and a median acrostichal row of short bristles between them. One pair of scutellar bristles. Proepisternum with 2-4 bristles. Anepisternum bare. Vein Sc ending free. Crossvein r-m more than twice as long as stem of median fork. Base of posterior fork beyond that of median fork, the veins of both forks usually bare. Veins R_{4+5} and M_1 divergent on apical half. Hind coxa with a single posterobasal bristle. Hind tibia with series of short posterior bristles near tip. Hind tibial spurs may be more or less than half length of tarsomere 1. Wing length 2.0-4.5 mm.

Male genitalia very diverse; ventral excavation sometimes deep but often shallow or practically absent, with median hypandrial lobe variously developed (sometimes identified as the aedeagus by Zaitzev – the aedeagus is here considered to be a small internal structure below tergite 9). Female cercus usually two-segmented, rarely (e.g. *E. bicincta*, *E. seriata*) one-segmented; tergite 7 often with specific structure to apical margin.



Figure 128. (a) *Exechia parva* ♂. (b) *Exechia festiva* ♂.

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There are 40 European species, of which 28 are recorded from Britain. The keys by Zaitzev (2003), to 49 species recorded from Russia, include 24 of the British species. While the key below is based primarily on male genitalia, females of some species may be identified from external characters such as the form of the apical margin of tergite 7; the female of *E. seriata* is very distinct by its broad depressed ovipositor, while females of the three species with more than 2 proepisternals cannot presently be reliably separated from each other. For most species coloration is summarised within square brackets in key couplets.

Key to *Exechia* Winnertz

1. Wing with a more or less distinct dark central spot (arrowed). Hypandrial lobe large, deeply bifurcate (arrowed). Two proepisternal bristles [Male tergite 2 yellow laterally, 3 basally; female tergites 3-6 with basal yellow triangles] *macula* Chandler, 2001 (p. 171)
- Wing unmarked 2

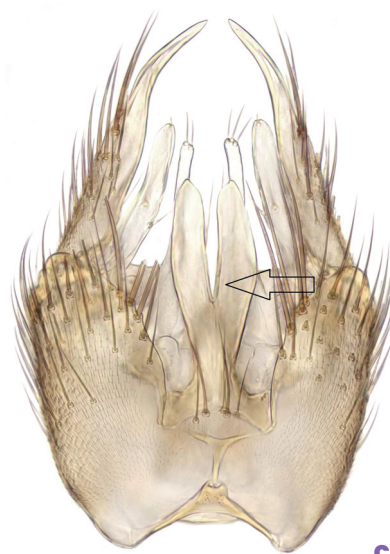
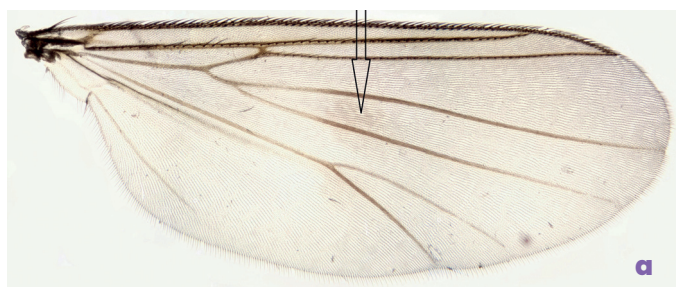
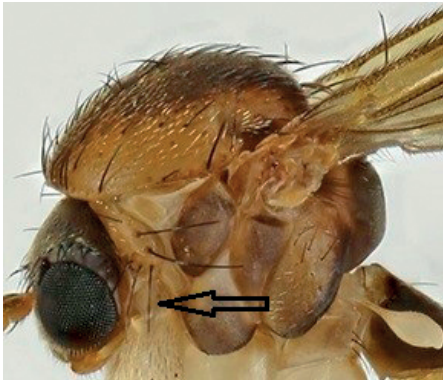


Figure 129. *Exechia macula*: (a) wing; (b) dorsal and (c) ventral view of ♂ genitalia.

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2. Proepisternum with 3-4 bristles (arrowed). Male tergites 2 and 3 yellow on basal and lateral margins (as in figure of *E. contaminata*), female with abdomen more extensively yellow 3
- Proepisternum with 2 bristles 5



b

a

Figure 130. *Exechia contaminata*: (a) head and thorax; (b) male abdomen.

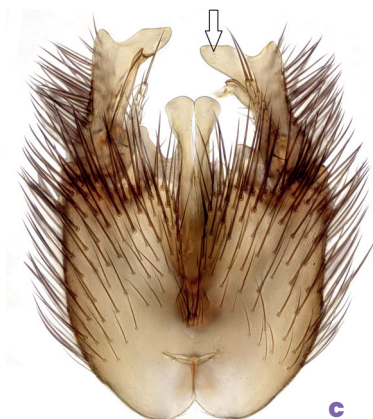
3. Gonostylus with dorsal lobe bearing a long awl-shaped process medially (arrowed)..... *pseudocincta* Strobl, 1910 (p. 173)
- Gonostylus with dorsal lobe at most bearing a short appendage 4
4. Gonostylus with dorsal lobe bearing a narrow pointed process apically (arrowed)..... *nigroscutellata* Landrock, 1912 (p. 172)
- Gonostylus with dorsal lobe bearing a broad angular process apically (arrowed)..... *contaminata* Winnertz, 1864 (p. 169)



a



b



c

Figure 131. Ventral views of ♂ genitalia of *Exechia*: (a) *pseudocincta*; (b) *nigroscutellata*; (c) *contaminata*.

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5. Crossvein r-m setulose on greater part (arrowed). Gonostylus with dorsal lobe bearing long bristles apically (arrowed). Female with ovipositor broad, depressed dorsoventrally. [Mainly brownish, mesonotum with brown stripes more or less distinct; male tergites 1-4 yellow basally, genitalia yellow; female with all tergites yellow basally, ovipositor yellow] *seriata* (Meigen, 1830) (p.174)
- Crossvein r-m only setulose near junction with Rs (arrowed in figure of *E. dorsalis*). Gonostylus with dorsal lobe not bearing long bristles apically. Female with ovipositor not depressed dorsoventrally 6

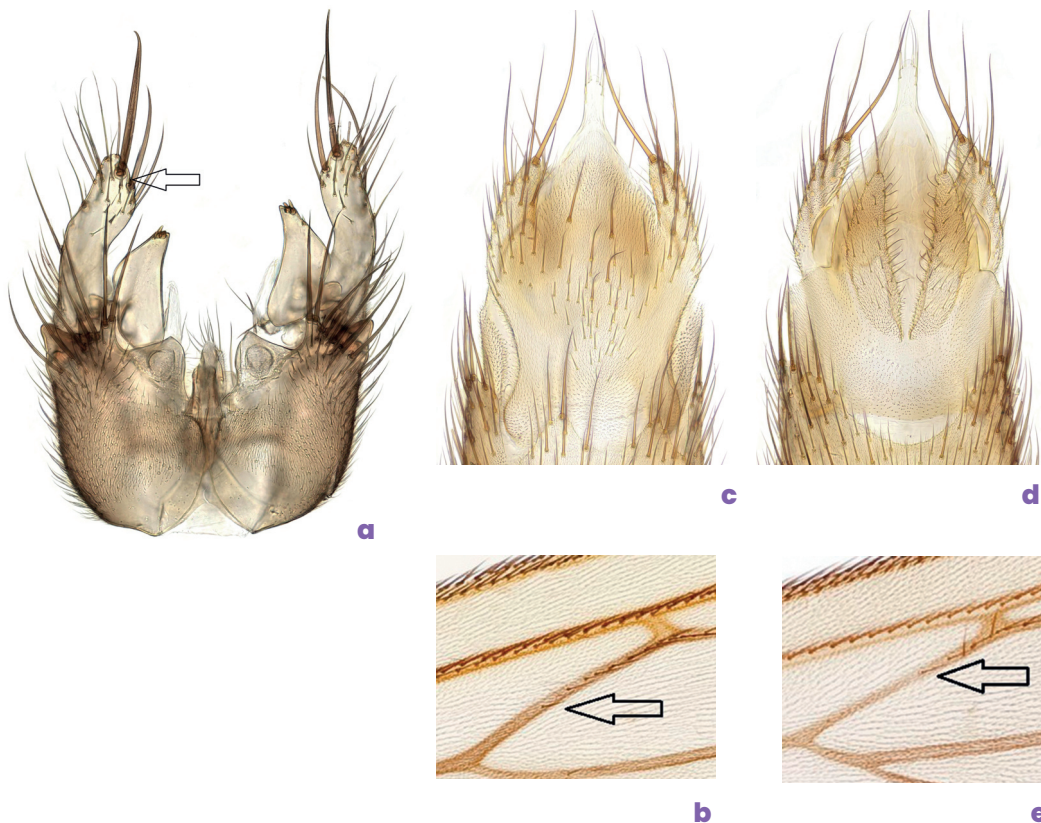


Figure 132. *Exechia seriata*: (a) ventral view of ♂ genitalia; (b) crossvein r-m; (c) female ventral view; (d) female dorsal view. *Exechia dorsalis*: (e) crossvein r-m.

6. Gonocoxites, on each side of a medial ventral excavation, with a more or less developed lobe, bearing strong spines or groups of bristles apically 7
- Gonocoxites without lobes bearing strong spines or groups of bristles 13

7. Gonostylus with dorsal lobe bare except for bearing a brush-like group of bristles (arrowed in dorsal view) apically and a row of strong bristles internally. Gonocoxites with a pair of strong bristles apically on each lobe (arrowed in ventral view). [Mesonotum yellow laterally; tergites 2-3 yellow laterally, extended dorsally on 3, genitalia brownish] *dorsalis* (Staeger, 1840) (p. 170)
- Gonostylus without a brush-like group of bristles on dorsal lobe 8



Figure 133. *Exechia dorsalis*:
(a) ventral and (b) dorsal view
of ♂ genitalia.

8. Gonocoxites with weak ventral projections, each bearing one strong bristle (arrowed in ventral view and upper arrow in figure of hypandrial lobe) on each side of a narrow medial cleft, within which a narrow hypandrial lobe bears 2 pairs of strong bristles (lower arrow in figure of hypandrial lobe). [Mesonotum grey with yellow humeral area; male tergites all dark or tergites 2-3 yellow laterally; female with tergites 2-6 yellow basally] *separata* Lundström, 1912 (p. 174)
- Gonocoxites with well-developed lobes bearing a group of strong bristles apically 9

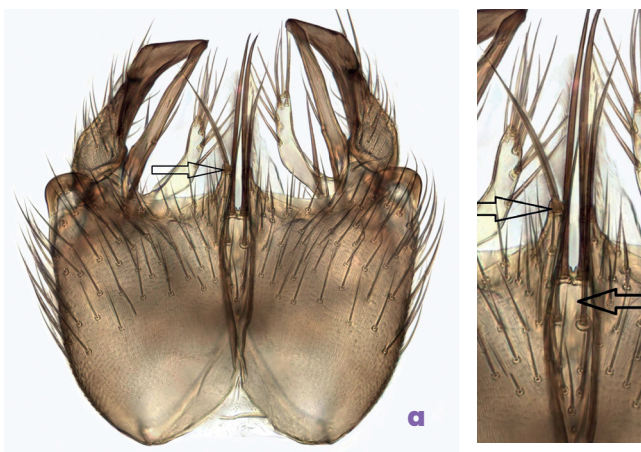
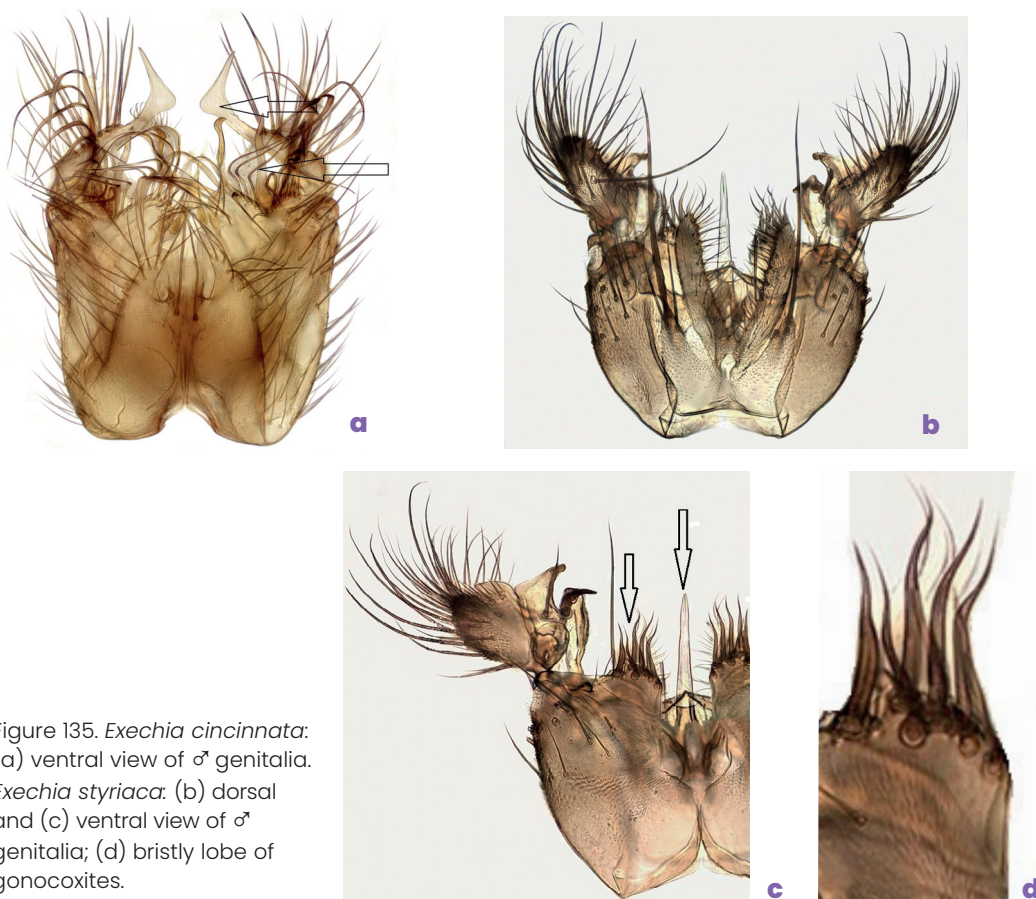


Figure 134. *Exechia separata*:
(a) ventral view of ♂ genitalia;
(b) hypandrial lobe.

9. Gonocoxites with shallowly rounded lobes bearing an apical group of strong bristles, which may be curved or bent 10
- Gonocoxites with lobes more elongate and apical bristles not curved or bent. [Male tergites mainly dark except sometimes for vague yellowish patches on 2-3, genitalia yellow; some females with yellow basal bands on tergites 3-4 not certainly assigned to species] 11
10. Gonocoxites with bristles on apical lobes (lower arrow) and those elsewhere on apical margin medially curved or bent outwards. Gonostylus with ventral lobe with long bristles on external surface, beyond these bare on apical half, constricted and then enlarged apically into a beak-like process (upper arrow). [Male tergites 2-4 yellow laterally, 3-4 narrowly dark apically] *cincinnata* Johannsen, 1912 (p. 168)
- Gonocoxites with bristles on apical lobes more erect and less strongly bent (left arrow). A prominent long slender bare apically pointed hypandrial process (right arrow). [Mesonotum with yellow humeral area; tergites 2-5 with yellow basal markings, in female less widely separated dorsally than in male and with tergite 6 and ovipositor all yellow] *styriaca* Strobl, 1898 (p. 175)



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11. Gonocoxites with bare preapical part of each lobe short (arrowed in ventral view); gonostylus with dorsal lobe broad with a short blunt apical process on internal margin (arrowed in dorsal view)..... *parva* Lundström, 1909 (p. 172)
- Gonocoxites with longer narrower lobe, with longer portion of its shaft bare before terminal bristles (arrowed in ventral view of each species) 12
12. Gonostylus with dorsal lobe elongate and slender apically (arrowed in dorsal view) ...
..... *neorepanda* Lindemann in Lindemann, Søli & Kjærandsen, 2021 (p. 172)
- Gonostylus with dorsal lobe short and broad with a straight-edged apical margin (arrowed in dorsal view) *repandoides* Caspers, 1984 (p. 174)

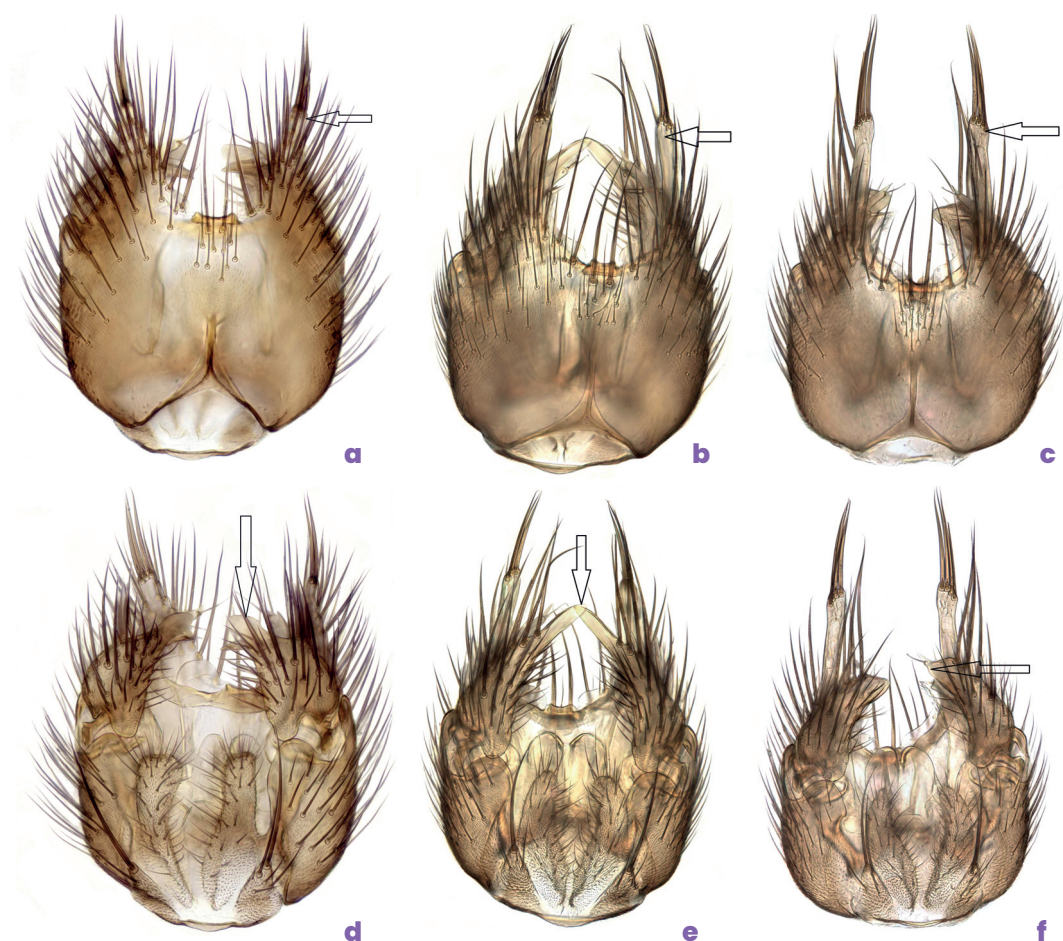


Figure 136. Ventral views of ♂ genitalia of *Exechia*: (a) *parva*; (b) *neorepanda*; (c) *repandoides*.
Dorsal views of ♂ genitalia of *Exechia*: (d) *parva*; (e) *neorepanda*; (f) *repandoides*.

13. Gonostylus with dorsal lobe strongly bent medially so that apical part (arrowed) is reflexed parallel to basal part. Gonocoxites with a deep apical excavation, bearing two strong bristles (arrowed) on each side of its margin. Female cercus one-segmented (arrowed). [Tergites 2-4 in male, all tergites in female, yellow basally] *bicincta* (Staeger, 1840) (p. 168)
- Gonostylus with dorsal lobe at most slightly curved. Female cercus two-segmented 14

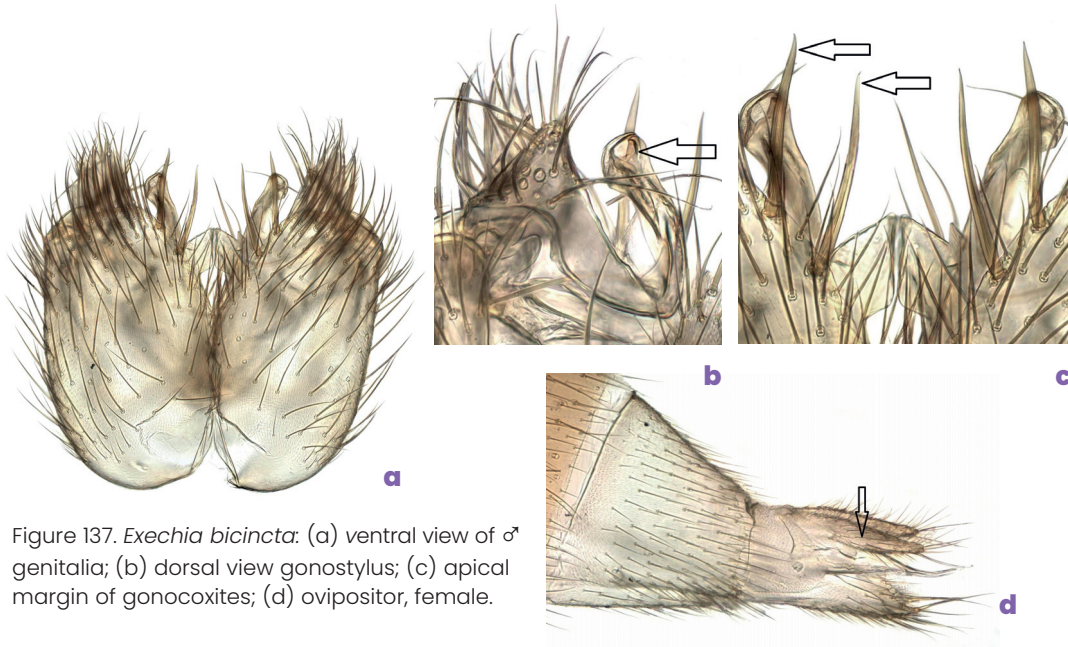


Figure 137. *Exechia bicincta*: (a) ventral view of ♂ genitalia; (b) dorsal view gonostylus; (c) apical margin of gonocoxites; (d) ovipositor, female.

14. Gonostylus with dorsal lobe bearing dense fine bristles on internal face 15
- Gonostylus with dorsal lobe not bearing dense fine bristles on internal face 17
15. Gonostylus with dense fine bristles (arrowed) covering entire internal face of dorsal lobe. [Mesonotum dark brown dorsally, yellow on humeral area and sides. Tergites 2-5 in male, 2-6 in female, yellow basally] *festiva* Winnertz, 1864 (p. 170)
- Gonostylus with dense fine bristles only on apical part of internal face of dorsal lobe (arrowed in each species). [Mesonotum all dark] 16

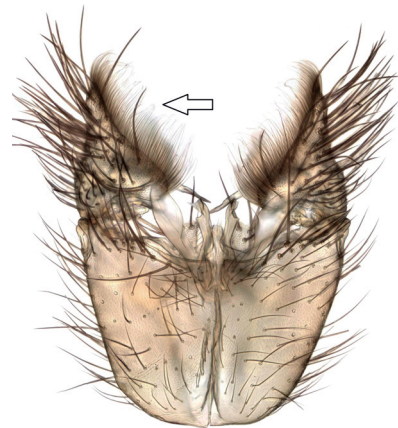


Figure 138. *Exechia festiva*, ventral view of ♂ genitalia

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16. Gonostylus distinctly shorter than gonocoxites. [Male tergites 2-3 yellow basally]
 *chandleri* Caspers, 1987 (p. 168)

- Gonostylus subequal or longer than gonocoxites. [Male abdomen all dark or tergites 2-4 with yellow basal patches, genitalia brownish yellow; female with all tergites yellow basally]
 *pseudofestiva* Lackschewitz, 1937 (p. 173)

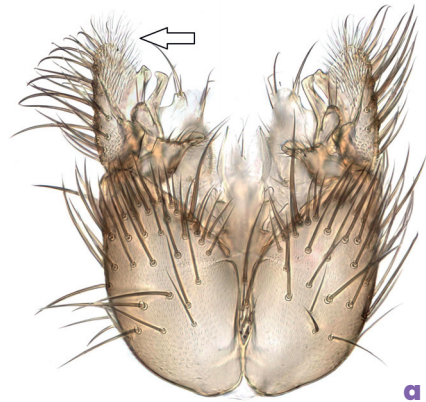


Figure 139. (a) *Exechia chandleri* ventral view of ♂ genitalia. *Exechia pseudofestiva*: (b) ventral and (c) dorsal view of ♂ genitalia.

17. Mesonotum shining black. Gonostylus with dorsal lobe bearing two medially directed processes (arrowed). [Male tergites 2-3 (-4) mainly yellow laterally, with a black dorsal stripe and apical margins; female tergites 2-6 mainly yellow]
 *lucidula* (Zetterstedt, 1838) (p. 171)
- Mesonotum dull 18

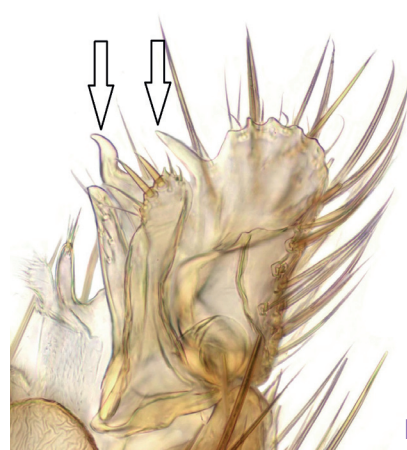


Figure 140. *Exechia lucidula*: (a) ventral view of ♂ genitalia and (b) gonostylus.

18. Gonostylus with dorsal lobe bearing a row of black spinules (arrowed) on its outer face. Hypandrial lobe broadened apically, only slightly concave medially (arrowed in ventral view). [Body including genitalia and antennae all black, legs yellow with coxae darker] *pectinivalva* Stackelberg, 1948 (p. 173)
- Gonostylus without a row of spinules on dorsal lobe 19

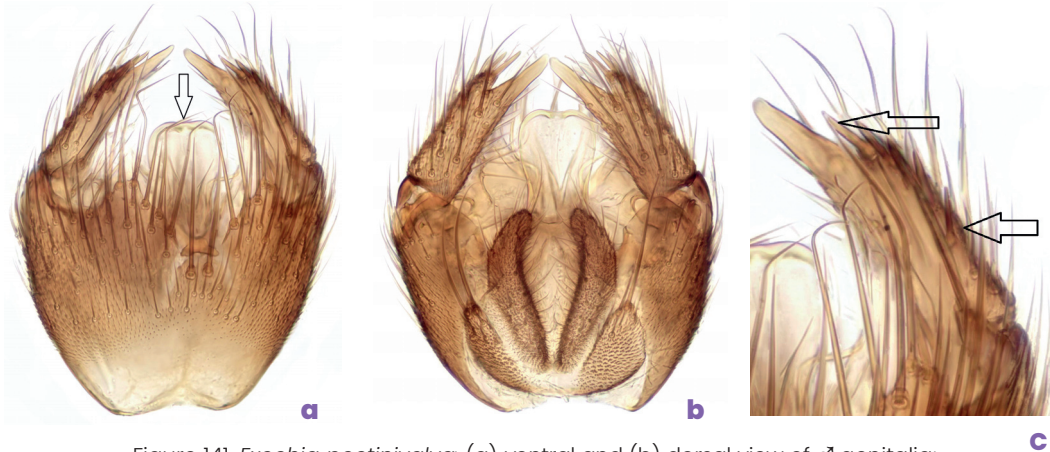


Figure 141. *Exechia pectinivalva*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) gonostylus, arrows = spinules on gonostylus.

19. Gonostylus with dorsal (outer) lobe short, rounded apically and uniformly bristled; medial lobe tapered apically with short spinose bristle at tip (upper arrow for *E. exigua*) 20
- Gonostylus with dorsal (outer) lobe longer than other lobes; medial lobe not tapered apically and without spinose bristle at tip 22
20. Gonostylus with internal lobe triangular and bearing a short spinose bristle (lower arrow) at inner anterior corner. Hypandrial lobe short, rounded apically. [Tergites 2-3 with yellow basal patches in male, extended dorsally on 3] *exigua* Lundström, 1909 (p. 170)



Figure 142. *Exechia exigua*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) gonostylus.

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- Gonostylus with internal lobe bearing two longer curved bristles (arrowed in each species) on its anterior margin. Hypandrial lobe long and shallowly cleft apically 21
21. Hypandrial lobe bearing two strong bristles and some shorter ones basally (arrowed). [Body all black in both sexes. Antennae all dark including basal segments] *nigra* Edwards, 1925 (p. 172)
- Hypandrial lobe lacking strong bristles basally (lower arrow). [Male tergites 2-3 with more or less distinct yellow lateral markings; on all tergites in female] *parvula* (Zetterstedt, 1852) (p. 173)

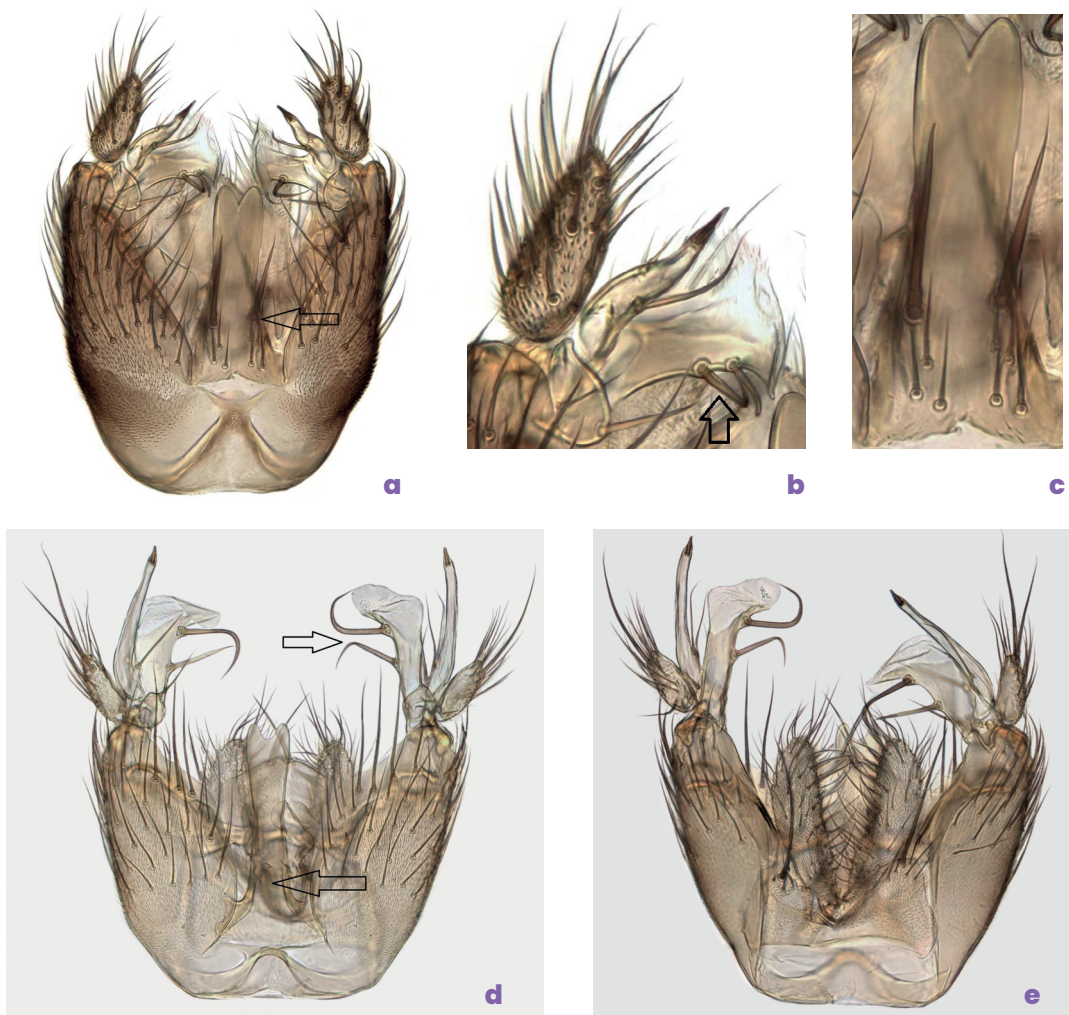


Figure 143. *Exechia nigra*: (a) ventral view of ♂ genitalia; (b) gonostylus and (c) hypandrial lobe. *Exechia parvula*: (d) ventral and (e) dorsal view of ♂ genitalia.

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22. Gonostylus with dorsal (outer) lobe mainly bristly but bearing a bare subapical internal process. Hypandrial lobe shallowly cleft apically; basal to it a small median bristly lobe (presumed part of sternite 9). [Male tergites all dark, female may have basal yellow markings (on tergites 2-7 in *E. fusca*, females of other species not certainly recognised)] 23
- Gonostylus with dorsal (outer) lobe tapered and bare apically but without such an internal appendage. Hypandrial lobe deeply cleft apically. [Male tergites with some yellow markings, more extensive in female] 27
23. Gonostylus with bare internal process of dorsal lobe short and at most slightly projecting beyond its apex, which appears shallowly forked (arrowed; lower arrow indicates tip of hypandrial lobe) *borealis* Lundström, 1912 (p. 168)

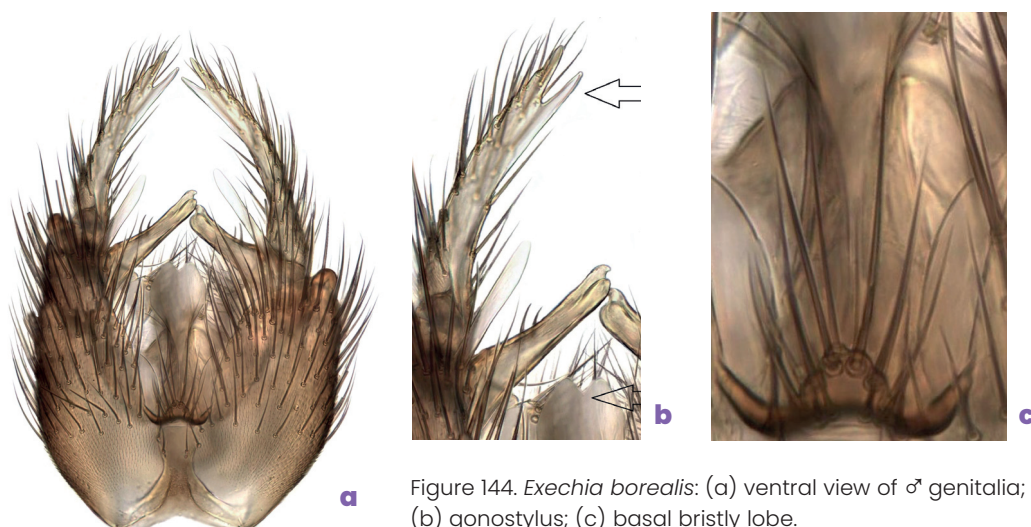


Figure 144. *Exechia borealis*: (a) ventral view of ♂ genitalia; (b) gonostylus; (c) basal bristly lobe.

- Gonostylus with bare internal process of dorsal lobe long 24
24. Gonostylus with internal process of dorsal lobe not reaching beyond its apex 25
- Gonostylus with internal process of dorsal lobe projecting beyond its apex 26
25. Gonostylus with internal process (arrowed) almost as thick as outer lobe. Gonocoxites with basal bristly lobe slender with few bristles, usually only 2 long bristles apically *spinigera* Winnertz, 1864 (p. 175)
- Gonostylus with internal process (arrowed) more slender and awl-shaped. Gonocoxites with basal bristly lobe broader and with several bristles *spinuligera* Lundström, 1912 (p. 175)

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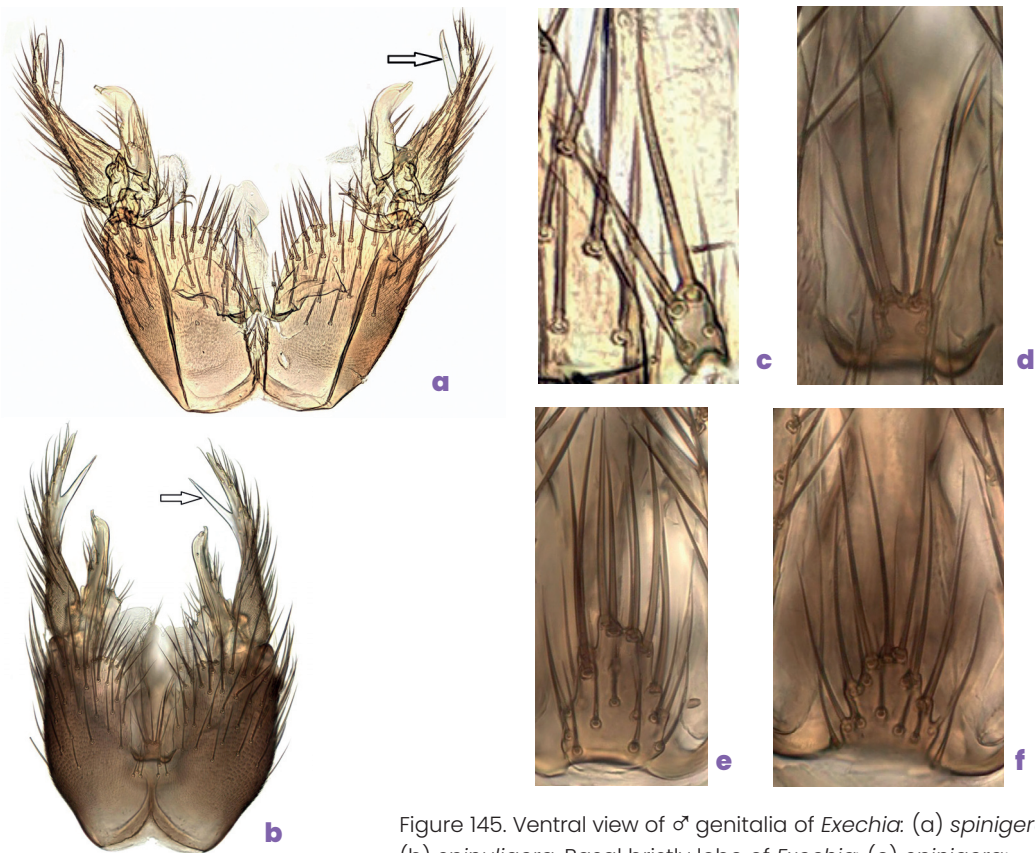


Figure 145. Ventral view of σ genitalia of *Exechia*: (a) *spinigera*; (b) *spinuligera*. Basal bristly lobe of *Exechia*: (c) *spinigera*; (d) *spinuligera*; (e) *fusca*; (f) *confinis*.

26. Gonostylus with bare internal process of dorsal lobe slender and not broadened apically (arrowed) *fusca* (Meigen, 1804) (p. 170)
- Gonostylus with bare internal process of dorsal lobe more blade-like and slightly broadened on distal half (arrowed) *confinis* Winnertz, 1864 (p. 169)

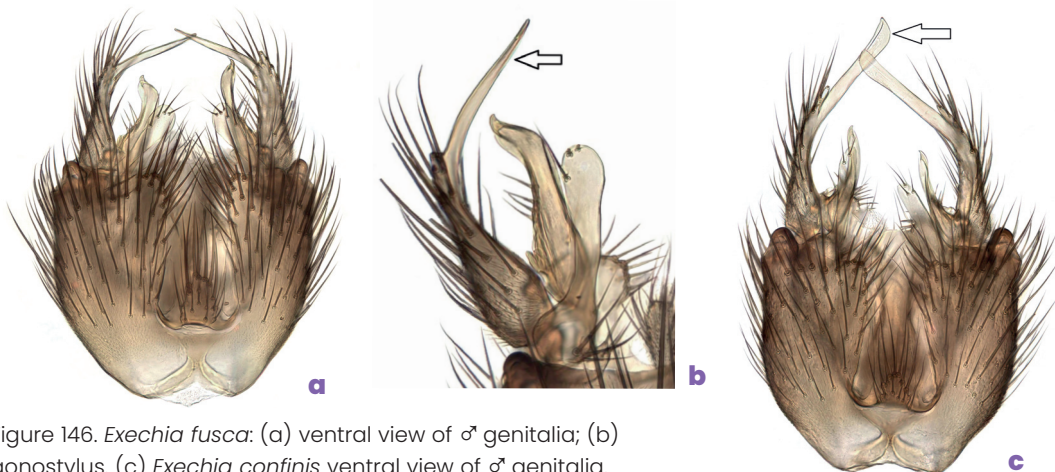


Figure 146. *Exechia fusca*: (a) ventral view of σ genitalia; (b) gonostylus. (c) *Exechia confinis* ventral view of σ genitalia.

27. Gonostylus with medial lobe bifurcate apically (variation in forking arrowed for two examples: East Finchley, x-xi.2017, left, the specimen figured in ventral view, and Talybont xi.2018, right; the latter fits Zaitzev's figure). A pair of lobes bearing long bristles basal to deeply cleft hypandrial lobe (arrowed in ventral view). [Male tergite 2 yellow on side margin; 3-4 yellow basally, extended towards hind margin laterally; 6 yellowish apically; female not seen] *dizona* Edwards, 1924 (p. 169)

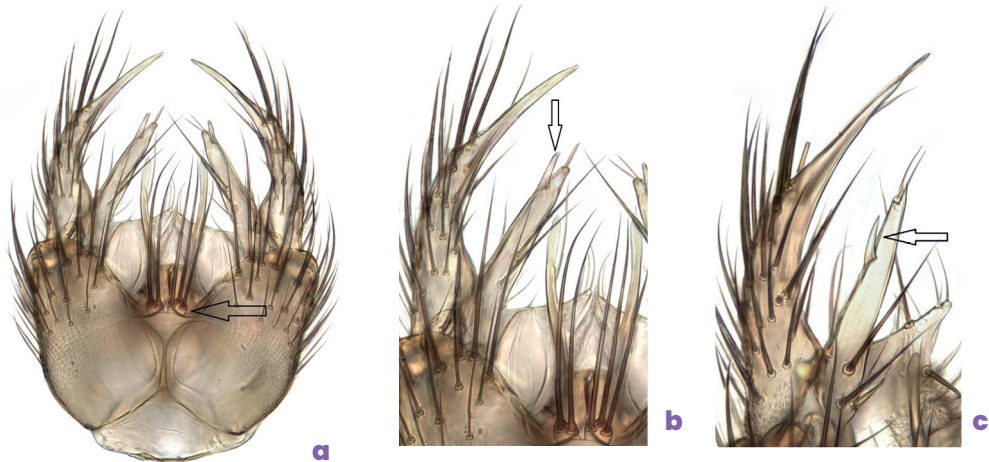


Figure 147. *Exechia dizona*: (a) ventral view of ♂ genitalia; (b) and (c) variation in medial lobe of gonostylus.

- Gonostylus with medial lobe pointed apically (upper arrow). Hypandrial lobe (lower arrow) without basal bristly lobes. [Male tergite 2 yellow on side margin; 3 yellow on basal half, extended towards hind margin laterally; 4-6 all dark. Female tergites all yellow basally; tergite 7 with apical margin produced in bristly lobes medially and laterally] *cincta* Winnertz, 1864 (p. 169)

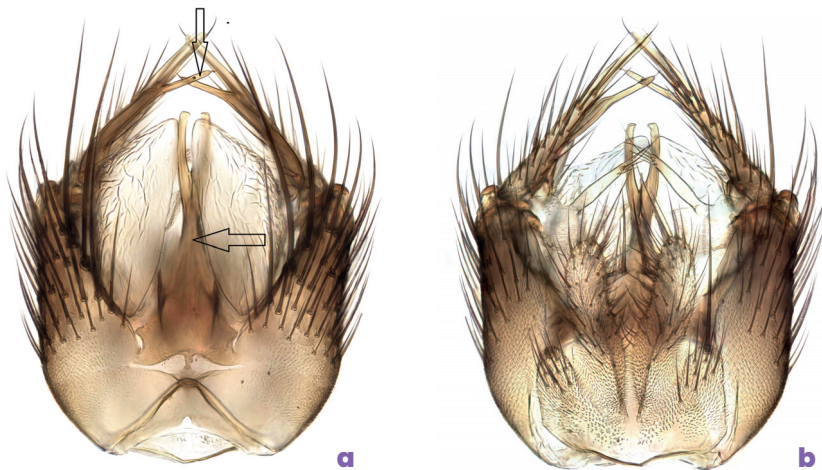


Figure 148. *Exechia cincta*: (a) ventral and (b) dorsal view of ♂ genitalia.

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Species notes

Exechia bicincta (Staeger, 1840)

Distribution. Common in Wales and S England north to Yorks; there is also one Scottish record (Upper Quoich, 2000) and an Irish record from Renagowan, Co Kerry (2010, R. Deady). Holarctic, widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. Develops in several genera of agarics and boletes, mostly terrestrial species but including saproxylic species of *Mucidula*, *Mycena*, *Pluteus* and *Pleurotus*. **British records:** *Pluteus salicinus* (Chandler 1993b), *Mycena galericulata* (J. Webb), *Amanita rubescens*, *Mucidula mucida*, *Mycena haematopus* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Chroogomphus rutilus* (Eisfelder 1955), *Omphalotus olearius* (Ribeiro 1990), *Gymnopus erythropus*, *Hygrophoropsis aurantiaca*, *Megacollybia platyphylla*, *Mycena galericulata*, *M. inclinata*, *Pleurotus ostreatus*, *Tricholoma populinum* (Dely-Draskovits 1974), *Russula virescens* (Russian record cited by Jakovlev 1994), *Hemileccinum impolitum*, *Russula violeipes*, *Xerocomellus pruinatus*, *Xerocomus subtomentosus* (Ševčík 2006, 2010). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Exechia borealis Lundström, 1912 [*frigida* misident.]

Distribution. Common in Scotland, N England and Wales, with a few sites in East Anglia (2 hectads) and S England (3 hectads), also in Shetland; two Irish records (Glendalough, Co Wicklow, 1986; Carrigagulla Wood, Co Cork, 2010). Widespread in Europe.

Habitat. A range of wooded and open habitats, including carr and Caledonian pine forest.

Biology. Unknown, but it is uncertain if a record of *E. frigida* from a *Hypholoma* species (Hackman and Meinander 1979) refers to this species. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Exechia chandleri Caspers, 1987

Distribution. Scattered sites across central S England (8 hectads, 4 post-2000): Devon, Somerset, Oxon, Bucks, Essex and Northants, with the most northerly record in Lincs (Wolla Bank Pit, 2017). Widespread in C and N Europe.

Habitat. Ancient woodland, wet woodland and carr; the first British record from Somerset was from the margin of a pool on open marshy ground, near to conifer plantations.

Biology. Unknown.

Exechia cincinnata Johannsen, 1912

Distribution. Only known in Britain from a single male found at Loggerheads Country Park, Denbighshire (14.x.1994, Chandler). It is a widespread North American species, otherwise unknown in the Palaearctic Region, so may have been a chance introduction that has not become established.

Habitat. The only British site was dry beech woodland.

Biology. **No British records.** **Other records:** it has been reared in N America from the terrestrial bolete *Xerocomus* (as *Boletus*) *ferrugineus*.

***Exechia cincta* Winnertz, 1864**

Distribution. First recorded in Britain in 1985, but the number of records is rapidly increasing, suggesting a recent spread. It is now widespread (97 hectads) in S England and S Wales, with a few more northerly records, one each from the Scottish Borders (Cardrona Forest Park, 18.ix.2009), the Isle of Man (Ballaugh, 1.v.2010, S. Crellin) and Ireland (St John's Wood, Co Roscommon, 8.x.2010). Palearctic, widespread in Europe.

Habitat. Woodland, especially wet woods with streams.

Biology. No British records. Other records: the terrestrial fungus *Hygrophoropsis aurantiaca* (Hackman and Meinander 1979, Finland).

***Exechia confinis* Winnertz, 1864**

Distribution. Frequent throughout the north and west of Britain, including Scotland, N England, Wales and SW England, with a few outlying records from the Weald. One Irish record from Glendalough, Co Wicklow (3.x.1980). Palearctic, widespread in Europe.

Habitat. Woodland, especially wet woods with streams.

Biology. Develops in terrestrial fungi. It has been reared several times from *Paxillus*, leading Ševčík (2010) to suggest that it was specific to it. No British records. Other records: *Lactifluus piperatus* (Plassmann 1971, Germany), *Paxillus involutus* (Hackman and Meinander 1979, Finland; Kurina 1994, Estonia; Ševčík 2006 and 2010, Czech Republic).

***Exechia contaminata* Winnertz, 1864**

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man. Holarctic, widespread in Europe.

Habitat. All types of woodland.

Biology. Develops in terrestrial fungi of the family Russulaceae; a record from the saproxylic agaric *Hypholoma* requires confirmation. British records: *Hypholoma* (Chandler 1978b), *Lactarius turpis* (Trifourkis 1977, P. Chandler). Other records: *Lactarius pallidus* (Plassmann 1971), *L. turpis*, *L. torminosus* (Hackman and Meinander 1979), *L. trivialis*, *L. rufus* (Kurina 1998), *Russula adusta* (Russian record cited by Jakovlev 1994).

***Exechia dizona* Edwards, 1924**

Distribution. After an early record from Studland, Dorset (5.x.1910, J.W. Yerbury) it was not found in Britain again until 1988, though the first Irish records were in 1977, and there has been a recent increase in records. Records from 35 hectads scattered throughout England and Wales, with three Scottish records from Galloway (Mersehead Farm RSPB Reserve, 4.xi.2002, C. Spilling) and the Highlands (Ben Lawers, 14.vi.2012, I. Perry; Migdale Wood, 20.vii.2018, I. Perry). It is widespread in Ireland. Palearctic, widespread in Europe.

Habitat. Damp woodland and wetlands.

Biology. It has been reared from several genera of agarics. British records: *Hygrophorus eburneus* (R. Fortey; Fortey and Chandler 2021). Other records: *Mycena* sp., *Russula* sp., *Stropharia hornemannii* (Jakovlev 1994, his own rearings in Karelia), *Hygrocybe chlorophanus* (Ševčík 2010).

***Exechia dorsalis* (Staeger, 1840)**

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man. Palaearctic, widespread in Europe, also in N Africa.

Habitat. All types of woodland.

Biology. Larvae are polyphagous in boletes and many genera of agarics, both terrestrial and saproxylic. **British records:** *Amanita muscaria*, *Rhodocollybia maculata*, *Hebeloma mesophaeum*, *Inocybe* sp., *Tricholoma columbetta* (Chandler 1993b), *T. sulphureum* (P. Chandler), *Imleria badia* (J. Webb), *Rhodocollybia maculata* (Buxton 1960, Trifourkis 1977), *Cortinarius hinnuleus*, *Laccaria laccata* (Edwards 1925), *Macrolepiota procera* (J. Bowden), *Amanita citrina*, *Gymnopus erythropus*, *Laccaria laccata*, *Meripilus giganteus*, *Russula risigallina*, *Xerocomus* sp. (R. Fortey; Fortey and Chandler 2021), *Boletus* sp (Madwar 1937). **Other records:** *Amanita phalloides*, *Boletus*, *Calocybe*, *Gymnopus dryophilus* (Jakovlev 1994), *Collybia*, *Cortinarius*, *Entoloma*, *Gyroporus*, *Hebeloma mesophaeum*, *Hygrophorus*, *Laccaria*, *Lepiota*, *Mycena*, *Melanoleuca*, *Pholiota*, *Russula* (Dely-Draskovits 1974, Hackman and Meinander 1979, Kurina 1998, Landrock 1940, Plassmann 1971, Rimšaitė 2000, Ševčík 2006 and 2010, and Russian records cited by Jakovlev 1994).

***Exechia exigua* Lundström, 1909**

Distribution. Frequent in S England and Wales and also in the Scottish Highlands. One Irish record (Lough Conn, Co Mayo, 30.ix.1977). Palaearctic, widespread in Europe.

Habitat. Woodland, including dry woodland as well as carr.

Biology. Unknown.

***Exechia festiva* Winnertz, 1864**

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man. Palaearctic, widespread in Europe, also in N Africa.

Habitat. All types of woodland.

Biology. Surprisingly not yet recorded.

***Exechia fusca* (Meigen, 1804)**

Distribution. Very common throughout Britain and Ireland, also in Isle of Man, the Western Isles, Fair Isle and Jersey (map, Fig. 4a). Holarctic, widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. All types of wooded and open habitats.

Biology. Polyphagous in boletes and both terrestrial and saproxylic agarics; Edwards (1925) noted that larvae were most often in small numbers in the stem of small agarics. There are also records from the polypore *Trametes gibbosa* and Jakovlev (2011) reared it from decayed pine wood bearing an *Antrodia* species, together with *Cordyla parvipalpis*.

British records: *Amanita citrina*, *Hortiboletus rubellus*, *Infundibulicybe gibba*, *Rhodocollybia butyracea*, *Gymnopus erythropus*, *Hebeloma crustuliniforme*, *Hygrocybe chlorophana*, *Inocybe fraudans*, *Lepista nuda*, *Tricholoma terreum*, *Xerula radicata* (Edwards 1925), *Mycena galericulata*, *Trametes gibbosa* (Buxton 1960), *Marasmiellus*

confluens, *Gymnopus dryophilus*, *Conocybe tenera*, *Hebeloma pseudoamarescens*, *Inosperma cervicolor*, *Lacrymaria lacrymabunda*, *Lactarius tabidus*, *Lepiota clypeolaria*, *L. erminea*, *Leratiomyces ceres*, *Panaeolus papilionaceus*, *Pluteus cervinus*, *Psathyrella* sp., *Russula alutacea*, *R. cyanoxantha*, *R. fellea*, *R. grisea*, *R. ionochlora*, *Stropharia cyanea* (Chandler 1993b), *Hygrophoropsis aurantiaca*, *Russula emetica*, *R. sanguinea* (P. Chandler), *Armillaria*, *Cuphophyllus fornicatus*, *Flammulina velutipes*, *Hygrocybe quieta*, *Pholiota aurivella*, *Pseudosperma rimosum*, *Tubaria* sp. (J. Webb), *Chlorophyllum rhacodes*, *Marasmiellus confluens*, *Conocybe tenera*, *Mycena pura* (J. Bowden), *Xerocomellus chrysenteron*, *X. pruinatus*, *Crucibulum laeve*, *Gymnopus erythropus*, *Hygrophorus eburneus*, *Lactarius subdulcis*, *Mycena crocata*, *M. haematopus*, *Psathyrella piluliformis*, *Russula solaris*, *R. fellea*, *R. ochroleuca* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Agrocybe*, *Amanita*, *Armillaria*, *Arrhenia*, *Boletus*, *Chlorophyllum*, *Clitocybe*, *Conocybe*, *Cortinarius*, *Cystoderma*, *Entoloma*, *Flammulina*, *Galerina*, *Hebeloma*, *Hygrocybe*, *Hygrophorus*, *Hygrophoropsis*, *Inocybe*, *Leratiomyces*, *Leucoagaricus*, *Macrolepiota*, *Mycena*, *Mucidula*, *Phaeolepiota*, *Pluteus*, *Psilocybe*, *Rhodocollybia*, *Russula*, *Stropharia*, *Suillus*, *Tricholoma*, *Xerocomus* (Eisfelder 1955, Hackman and Meinander 1979, Kurina 1991, Ribeiro 1999, Riel 1921, Jakovlev 1994 and 2011, Ševčík 2006 and 2010). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Exechia lucidula* (Zetterstedt, 1838)**

Distribution. Scattered records in S England and one in Scotland (Logie, 1913). Most records are old and there were none between Chippenham Fen in 1941 and Mills Marsh in 1988. It has been found again at Chippenham Fen (12.ix.2019, I. Perry), the only record in the present century. Palearctic, widespread in Europe.

Habitat. Woodland and wetlands.

Biology. Rearing records are from agarics, both terrestrial and saproxylic, with a record from *Gyromitra*. **No British records.** **Other records:** *Gymnopus dryophilus*, *Inosperma erubescens* (Eisfelder 1955, Germany), *Laccaria laccata* (Dely-Draskovits 1974, Hungary), *Gyromitra esculenta*, *Inocybe lacera*, *Kuehneromyces mutabilis*, *Mycena galericulata*, *Pholiota vernalis* (Jakovlev 1994, his rearings from Karelia).

***Exechia macula* Chandler, 2001**

Distribution. Only known in Britain from three records from rather different sites: Woodbastwick in the Bure Marshes NNR, Norfolk (viii.1989, A. Foster & D. Procter); Langley Park, Bucks (x.2007, A. McVeigh); Besselsleigh Wood, Berks V.C. (15.x.2020, R. Mitchell). Palearctic, widespread in Europe.

Habitat. The British sites have little in common. The Bure Marshes record is presumed to be from carr woodland; the Langley Park record was from parkland with ancient trees; Besselsleigh Wood is a mixed ancient woodland.

Biology. Rearing records are from terrestrial and saproxylic agarics. **No British records.** **Other records:** *Armillaria gallica*, *Megacollybia platyphylla* (Jakovlev 1994, his rearings from Karelia), *Lepiota erminea* (Dely-Draskovits 1974, Hungary), *Agaricus* sp. (Ševčík 2006, 2010, Czech Republic).

***Exechia neorepanda* Lindemann in Lindemann, Søli & Kjærandsen, 2021**

Note. Following Edwards (1941), this species was until recently identified as *E. repanda* Johannsen, 1912, which was described from North America. It was thus regarded as Holarctic, but Lindemann *et al.* (2021) found the European species to be different, requiring a new name.

Distribution. Common in Wales and England north to Yorks, with many records from the 1980s Welsh and East Anglian wetland surveys; only two Scottish records from Galloway (Alticry, 2009) and the Highlands (Carrbridge, 2013) and one from Ireland (Moy, Co Tyrone, 1984, M. Boston). Widespread in Europe.

Habitat. Woodland, carr and wetlands.

Biology. Rearing records are from several genera of terrestrial and saproxylic agarics and from *Gyromitra*. Overwintering of adults in umbel stems has been recorded (Väisänen 1981, Lindemann *et al.* 2021). **British records:** *Calocybe gambosa* (J. Webb).

Other records (all as *repanda*): *Inocybe godeyi* (Dely-Draskovits 1974), *Amanita virosa*, *Gyromitra esculenta*, *Kuehneromyces mutabilis*, *Laccaria* sp., *Mycena galericulata*, *Paralepista flaccida* (Russian records cited by Jakovlev 1994), *Lyophyllum loricatum* (Ševčík 2006, 2010).

***Exechia nigra* Edwards, 1925**

Distribution. Common in the north and west, including Scotland, N England and Wales, with few records further south in England (Matley Bog in the New Forest, 1982; Woodwalton Fen, 1994); widespread in Ireland. Recent records are only from Scotland and N Wales. Palearctic, widespread in Europe.

Habitat. Broad-leaved and coniferous woodland; Welsh records include various wetland habitats.

Biology. Unknown.

***Exechia nigroscutellata* Landrock, 1912**

Distribution. Common throughout Britain; a few Irish records. Palearctic, widespread in Europe.

Habitat. All types of woodland.

Biology. Rearing records are from terrestrial fungi of the family Russulaceae, including many species of both *Russula* and *Lactarius*. **British records:** *Lactarius torminosus* (J. Webb).

Other records: *Lactarius deterrimus*, *L. helvus*, *L. turpis*, *L. resimus*, *L. tabidus*, *L. torminosus*, *Russula* (many species) (Eisfelder 1955, Hackman and Meinander 1979, Kurina 1998, Rimšaite 2000 and Russian records cited by Jakovlev 1994), also a Russian record from *Agaricus campestris* (Jakovlev 1994, requires confirmation).

***Exechia parva* Lundström, 1909**

Distribution. Common throughout Britain; widespread in Ireland. Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. It develops in several genera of terrestrial and saproxylic agarics, also a record

from the morel *Verpa*. Overwintering of adults in umbel stems has been recorded (Väisänen 1981, Kurina 1997, Lindemann *et al.* 2021). **No British records. Other records:** *Armillaria borealis*, *Hypholoma capnoides*, *Kuehneromyces mutabilis*, *Mycena galericulata*, *Paralepista flaccida*, *Verpa bohemica* (Jakovlev 1994, his rearings from Karelia), *Cortinarius* sp. (Kurina 1991, Estonia), *Bogbodia ?uda* (Hackman and Meinander 1979, Finland), *Russula ochroleuca* (Plassmann 1971, Germany).

***Exechia parvula* (Zetterstedt, 1852)**

Distribution. Common throughout Britain; widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland, carr and wetlands.

Biology. **No British records. Other records:** *Inocybe lacera* (Jakovlev 1994, his rearing from Karelia), *Suillus luteus* (Falcoz 1926, France, requires confirmation). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Exechia pectinivalva* Stackelberg, 1948**

Distribution. Most records are from the 1980s Welsh wetland survey, where it was numerous in many samples from 43 sites in 38 hectads and including most vice-counties, as well as Wem Moss in Shropshire. Otherwise there are only scattered records from Hants (Cranes Moor, 11.vii.1995, I. Perry, the only post-1990 record), Cumbria (Cliburn and Cumwhitton, 1988–9, A. Godfrey) and one Scottish record (Black Wood of Rannoch, Perthshire, 31.viii.1987, Chandler). Palaearctic, widespread in Europe.

Habitat. Most records (those from Wales) are from wetlands, including blanket and raised bog, *Carex* and *Sphagnum* flushes, valley fens and carr. The Rannoch record is from a strip of wet mixed woodland between the pine forest and the loch shore.

Biology. It develops in terrestrial agarics. **No British records. Other records:** *Infundibulicybe gibba*, *Inocybe lacera*, *Laccaria laccata* (Jakovlev 1994, his rearings from Karelia).

***Exechia pseudocincta* Strobl, 1910**

Distribution. Common in the Scottish Highlands (42 hectads), with a record in Galloway (Glen Trool Forest, 2009) and scattered records in England (11 hectads) and Wales (4 hectads). In Ireland recorded from two sites in Co Wicklow (Glendalough, Derrybawn, 1984). Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. It develops in terrestrial agarics. **No British records. Other records:** *Hebeloma crustuliniforme* (Dely-Draskovits 1974, Hungary), *Lactarius deliciosus*, *L. deterrimus* (Eisfelder 1955 and 1956, Germany; Hackman and Meinander 1979, Finland; Kurina 1991, Estonia).

***Exechia pseudofestiva* Lackschewitz, 1937**

Distribution. Common in England and Wales, with a cluster of records in the central Scottish Highlands and also present in the Caithness Flow Country. It was one of the commonest species in the 1980s Welsh, Oxfordshire and East Anglian wetland surveys. There are four widely scattered Irish records. Palaearctic, widespread in Europe.

Habitat. Wet woodland and a wide range of wetland habitats.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Exechia repandoides Caspers, 1984

Distribution. Local with scattered records in S Wales and England north to Yorks. Widespread in C and N Europe.

Habitat. Woodland, carr and wetlands.

Biology. It develops in terrestrial agarics. **No British records.** **Other records:** *Cortinarius* sp., *Tricholoma sejunctum* (Ševčík 2006, 2010, Czech Republic).

Exechia separata Lundström, 1912

Distribution. Widespread in Britain, with most records from SE England and the Scottish Highlands. Also in Isle of Man (Aust Reserve, Lezayre, 22.x.2019, S. Crellin). Palearctic, widespread in Europe.

Habitat. Woodland and heathland.

Biology. Develops mainly in boletes but there are also records from *Gyromitra* and several genera of mostly terrestrial agarics. **British records:** *Chroogomphus rutilus*, *Gomphidius glutinosus*, *Suillus bovinus*, *S. flavidus* (Edwards 1925, Madwar 1937, Chandler 1993b). **Other records:** *Amanita gemmata*, *A. rubescens*, *Armillaria mellea*, *Boletus edulis*, *B. pinophilus*, *Hortiboletus rubellus*, *Chalciporus piperatus*, *Clitocybe costata*, *C. odora*, *Cortinarius collinitus*, *Gyromitra esculenta*, *Leccinum scabrum*, *Paralepista flaccida*, *Psathyrella spadiceogrisea*, *Russula* sp., *Suillus cavipes*, *S. granulatus*, *S. grevillei*, *S. luteus*, *S. variegatus*, *Xerocomus subtomentosus* (Eisfelder 1955, Hackman and Meinander 1979, Kurina 1998, Ribeiro 1990, Ševčík 2006 and 2010, Jakovlev 1994).

Exechia seriata (Meigen, 1830)

Distribution. Common throughout Britain; widespread in Ireland. Palearctic, widespread in Europe.

Habitat. All types of woodland.

Biology. Develops in boletes and agarics, with the majority of records from *Russula* (24 species), with some from other genera of terrestrial agarics, as well as some saproxylics.

British records: *Macrolepiota procera*, *Russula ochroleuca* (J. Webb), *Suillus granulatus* (P. Chandler), *Russula olivacea* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Amanita phalloides*, *Aspropaxillus giganteus*, *Boletus edulis*, *Hygrophorus camarophyllus*, *Kuehneromyces mutabilis*, *Lactarius torminosus*, *Lactifluus vellereus*, *Pholiota vernalis*, *Russula aeruginea*, *R. alutacea*, *R. claroflava*, *R. cyanoxantha*, *R. delicata*, *R. emetica*, *R. fellea*, *R. fragilis*, *R. furcata*, *R. hydrophila*, *R. luteotacta*, *R. olivacea*, *R. paludosa*, *R. pectinata*, *R. puellaris*, *R. risigallina*, *R. sanguinaria*, *R. velenovskyi*, *R. vesca*, *R. vinosa*, *R. violeipes*, *R. xerampelina*, *Suillus variegatus*, *Tricholoma* sp., *Tricholomopsis rutilans* (Eisfelder 1955, Dely-Draskovits 1974, Hackman and Meinander 1979, Kurina 1991, Plassmann 1971, Rimšaite 2000, Ševčík 2006 and 2010, and Russian records cited by Jakovlev 1994).

***Exechia spinigera* Winnertz, 1864**

Distribution. Only known in Britain from the Gwent Levels at Newton, Glamorgan (4–6.viii.2009) (Gibbs 2011) and the same site (4–6.viii.2014, water trap, D. Gibbs), and Trawscoed in N Wales (15.xi.2015, at MV light, A. & J. Graham). Palaeartic, widespread but scarce in Europe.

Habitat. Unclear. The original Gwent record was from near a brackish ditch behind a sea wall; this was dominated by *Phragmites* with some bramble and scrub encroachment, and rough grassland on either side.

Biology. Unknown.

***Exechia spinuligera* Lundström, 1912**

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man and Jersey. Palaeartic, widespread in Europe.

Habitat. Woodland, wetlands and other open habitats.

Biology. Reared from several genera of boletes and terrestrial agarics, as well as *Gyromitra*. **British records:** *Amanita muscaria* (Buxton 1960), *Hortiboletus rubellus*, *Hygrocybe quieta*, *Hypholoma elongatum* (J. Webb), *Hygrocybe chlorophana* (Edwards 1925), *Panaeolus papilionaceus* (Chandler 1993b), *Pluteus cervinus* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Amanita fulva*, *Armillaria mellea*, *Hebeloma crustuliniforme*, *Russula velenovskyi* (Kurina 1991), *Amanita rubescens*, *Gyromitra ancilis*, *Lactarius torminosus*, *Suillus bovinus* (Jakovlev 1994, Karelia), *Cortinarius romagnesii* (Ševčík 2006, 2010, on recultivated mine dumps in the Czech Republic and he commented that the habitat had an unusual fungus community).

***Exechia styriaca* Strobl, 1898**

Distribution. All British records are from Wales in September and October, with most in N Wales from 1971 to 1978; more recently there have been only three records, from Merionethshire (Mallwyd, 22.ix.1994, I. Perry – also found there in 1975; Trawscoed, 30.x.2015, A. & J. Graham) and Cardiganshire (Stradey Wood, 13.x.1995, Chandler). Palaeartic, widespread in Europe.

Habitat. Broad-leaved woodland.

Biology. Unknown.

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Genus *Exechiopsis* Tuomikoski

Usually more slender bodied than species of *Exechia*; some dark species but often brownish or yellowish; mesonotum may be all dark, dark dorsally and paler on side margins, or with three separate dark stripes on a yellow ground; when pale abdominal markings are present these are broadest along hind margins of tergites [but there are basal yellow markings in *E. seducta*].

Clypeus short, rounded or heart-shaped. Mesonotum with bristles usually well-developed centrally in dorsocentral rows (a median acrostichal row also developed in subgenus *Xenexechia*). Proepisternum with 1 strong bristle, a second shorter one sometimes present. Anepisternum bare. Vein Sc ending free [at least in *E. seducta*] or more or less distinctly ending in R. Crossvein r-m usually not more than twice as long as stem of median fork [these veins subequal in *E. seducta*; sometimes up to 3 times, see below]. Veins R_{4+5} and M_1 not divergent apically. Base of posterior fork beyond that of median fork, the veins of both forks usually bare, as are r-m and bm-m. Hind coxa with one strong posterobasal bristle, short setulae in line with it may include one basal to it. Hind tibia with a series of short posterior bristles on apical quarter to third. Wing length 3.0–4.5 mm.



Figure 149. (a) *Exechiopsis* (*E.*) *furcata* ♂. (b) *Exechiopsis* (*X.*) *crucigera* ♂.

Subgenus *Exechiopsis* Tuomikoski sensu stricto

Mostly larger species. Hind tibia with a dorsal excavation at tip and posterior apical margin distinctly oblique. Vein R_{4+5} downturned apically and convergent with vein M_1 . Wing length 3.5–4.5 mm.

Male genitalia with basal setulose part of sternite 9 more or less distinctly separated from fused gonocoxites by sutures, usually extended apically as a simple or bifid hypandrial lobe. Female with cercus one-segmented.

There are 32 European species, of which 16 occur in Britain. Of these 12 are among the 28 species keyed by Zaitzev (2003). The character he used of the relative lengths of crossvein r-m and the stem of the median fork (twice as long or not more than 1.5 x as long) is unreliable, as there are intermediate conditions and variation within species, e.g. specimens examined of *E. clypeata* may have r-m from 1.5 to 3 x length of the median stem.

The keys are based mainly on male genitalia. Females of many species are recognisable from the structure of the ovipositor and form of tergite 7, but females have not yet been associated for all species. Coloration is summarised within square brackets in key couplets.

Key to *Exechiopsis* Tuomikoski sensu stricto

1. Gonocoxites with hypandrial lobe bearing two or three processes apically 2
 - Gonocoxites with hypandrial lobe rounded, tapered or medially cleft apically but without processes 4
2. Gonocoxites with hypandrial lobe broad with a short medial process (arrowed) as well as a bristly lateral process on each side. [Mesonotum yellow with dark stripes; male tergites 1-4 (or 5) yellow apically] *clypeata* (Lundström, 1911) (p. 185)
 - Gonocoxites with hypandrial lobe bearing two tapered apical processes lacking bristles. [Mesonotum mainly dark, yellow on humeral area; tergites 2-5 yellow apically in male, all tergites in female] 3



Figure 150. *Exechiopsis clypeata*: (a) ventral view of ♂ genitalia and (b) apical part of hypandrial lobe.

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3. Hypandrial lobe narrow and bearing a short apically rounded projection (arrowed) between the apical processes. Gonostylus with medial processes of both lobes shorter and thicker *indecisa* (Winnertz, 1864) (p. 186)
- Hypandrial lobe broad medially and lacking any projection between the apical processes (straight edge arrowed). Gonostylus with medial processes more slender and elongate *pseudindecisa* (Laštovka & Matile, 1974) (p. 187)



Figure 151. Ventral view of ♂ genitalia: (a) *Exechiopsis indecisa*; (b) *Exechiopsis pseudindecisa*.

4. Gonocoxites with hypandrial lobe long and broad, constricted medially, then broadened subapically and slightly concave apically 5
- Gonocoxites with hypandrial lobe not broadened beyond a medial constriction 6
5. Gonocoxites with hypandrial lobe (arrowed) with rounded sides in apical portion. [Mesonotum with separate stripes on a yellow ground and all tergites yellow apically] *magnicauda* (Lundström, 1911) (p. 187)
- Gonocoxites with hypandrial lobe (arrowed) with sides of apical portion only slightly rounded, so appearing more parallel sided. [Mesonotum with more or less fused dark stripes, yellow on humeral area and laterally; tergites 1-4 yellow apically in male, all tergites in female] *subulata* (Winnertz, 1864) (p. 187)

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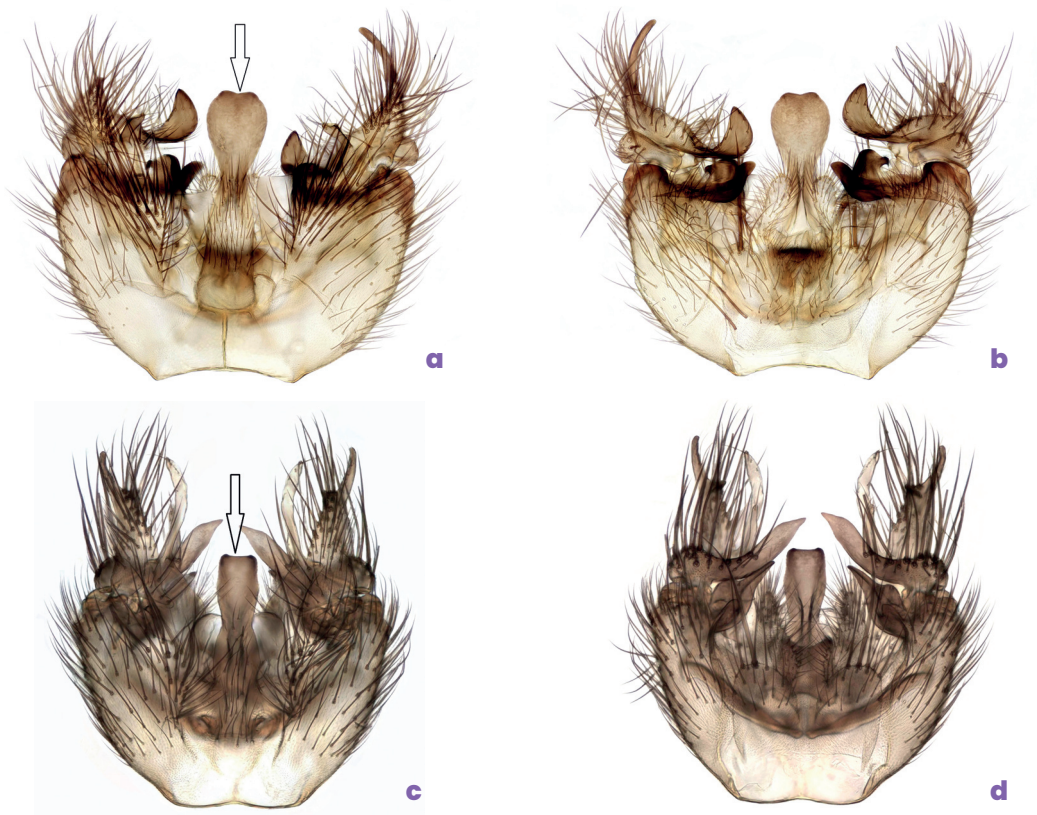


Figure 152. *Exechiopsis magnicauda*: (a) ventral and (b) dorsal view of σ genitalia.
Exechiopsis subulata: (c) ventral and (d) dorsal view of σ genitalia.

6. Gonocoxites with hypandrial lobe very short and slender (arrowed), much shorter than gonocoxites. [Mesonotum yellow with brown stripes; male tergites 2-4 with yellow apical triangles, narrowed dorsally] *forcipata* (Lackschewitz, 1937) (p. 185)
- Gonocoxites with hypandrial lobe almost reaching or exceeding apical margin of gonocoxites 7



Figure 153. *Exechiopsis forcipata*: (a) ventral view of σ genitalia and (b) hypandrial lobe.

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7. Gonocoxites with hypandrial lobe broad basally (arrowed), with an apically rounded elongate darkened apical projection. [Mesonotum brown with yellow humeral area; more or less narrow yellow apical markings on tergites 2-4 in male, all tergites in female] *unguiculata* (Lundström, 1911)(p. 188)
- Gonocoxites with hypandrial lobe if broad without such a projection or narrow for most of its length 8



Figure 154. *Exechiopsis unguiculata*
ventral view of ♂ genitalia.

8. Gonocoxites with a broad hypandrial lobe, tapered apically but without a narrower apical part 9
- Gonocoxites with hypandrial lobe relatively narrow for most of its length 11
9. Gonocoxites with hypandrial lobe weakly sclerotised and parallel-sided (arrowed), with a short medial point apically. [Mesonotum with fused dark stripes, yellow on humeral area and laterally; tergites 2-3 yellow apically in male, 2-4 in female]
..... *ligulata* (Lundström, 1913) (p. 187)
- Gonocoxites with hypandrial lobe strongly sclerotised and not parallel-sided 10



Figure 155. *Exechiopsis ligulata*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) hypandrial lobe.

10. Gonocoxites with hypandrial lobe oval with a short narrow upcurved sclerotised apical process (arrowed). [Mesonotum with separate dark stripes on a yellow ground and all tergites yellow apically] *intersecta* (Meigen, 1818) (p. 186)
- Gonocoxites with hypandrial lobe broad and shield-like, shallowly concave apically (arrowed). [Mesonotum with fused dark stripes, yellow on humeral area and laterally; tergites yellow apically, broadly on 2-4, narrowly or absent on 5-6 in male, all tergites in female] *hammi* (Edwards, 1925) (p. 186)



Figure 156. Ventral view of ♂ genitalia: (a) *Exechiopsis intersecta* and (b) *Exechiopsis hammi*.

11. Gonostylus with ventral lobe with concave apical margin (in lateral view), the resulting apical lobes (both lobes arrowed in figures of each species, *furcata* and *dryaspagensis*) bearing strong bristles. Gonocoxites with hypandrial lobe tapered from near base. [Mainly dark coloured in both sexes] 12
- Gonostylus with ventral lobe not bilobed. Gonocoxites with hypandrial lobe elongate, not tapered. [More brightly coloured] 13

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12. Gonocoxites with hypandrial lobe narrow on apical half with bifurcate tip (arrowed in enlarged figure of hypandrial lobe). [Mesonotum grey with small yellow humeral areas; tergites 2-4 with yellow apical patches laterally] *furcata* (Lundström, 1911) (p. 186)
- Gonocoxites with hypandrial lobe having a short narrow apical portion with a broad and shallowly concave sclerotised apical margin (arrowed in enlarged figure of hypandrial lobe). [Body all dark grey dusted] *dryaspagensis* Chandler, 1977 (p. 185)



Figure 157. *Exechiopsis furcata*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) hypandrial lobe. *Exechiopsis dryaspagensis*: (d) ventral view of ♂ genitalia; (e) gonostylus; (f) hypandrial lobe.

13. Gonocoxites with hypandrial lobe bearing a small triangular lateral projection (arrowed) on each side medially. [Mesonotum with separate stripes on a yellow ground; all tergites yellow apically, in male broadly on 2-4, narrowly on 5-6]
 *dumitrescae* (Burghele-Balacesco, 1972) (p. 185)
- Gonocoxites with hypandrial lobe lacking such projections 14

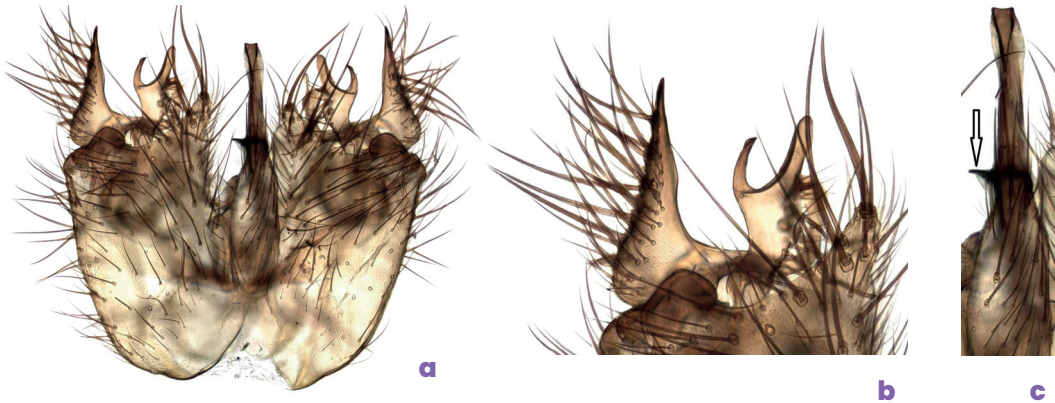


Figure 158. *Exechiopsis dumitrescae*: (a) ventral view of ♂ genitalia; (b) gonostylus; (c) hypandrial lobe.

14. Gonostylus with ventral lobe broad and bearing dense comb-like bristling (arrowed) on inner margin. [Mesonotum yellow with three more or less fused brown stripes; all tergites yellow apically, in male broadly on 2-4, narrowly on 5-6]
 *fimbriata* (Lundström, 1909) (p. 185)
- Gonostylus with ventral lobe narrow and normally bristled 15

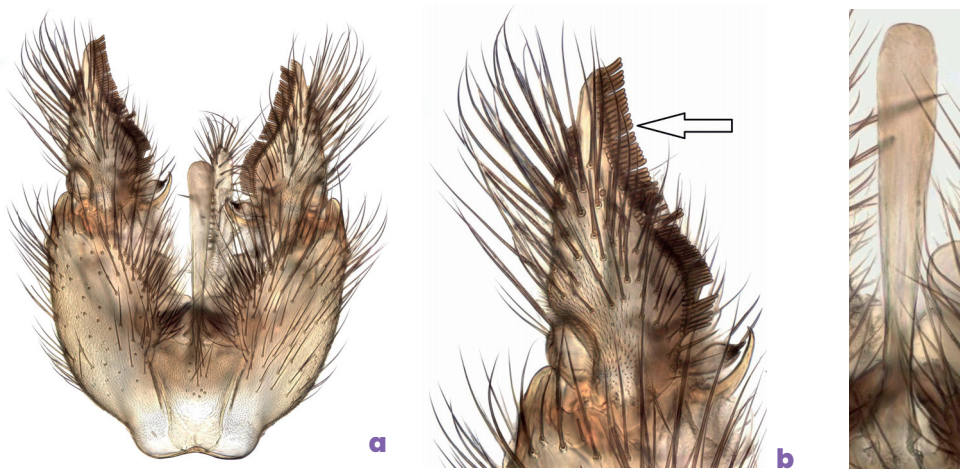


Figure 159. *Exechiopsis fimbriata*: (a) ventral view of ♂ genitalia; (b) gonostylus; (c) hypandrial lobe.

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15. Gonostylus with dorsal lobe (arrowed as dl) slender, curved and tapered apically. [Mesonotum mainly grey dusted; tergites 2–5 yellow apically] *jenkinsoni* (Edwards, 1925) (p. 186)

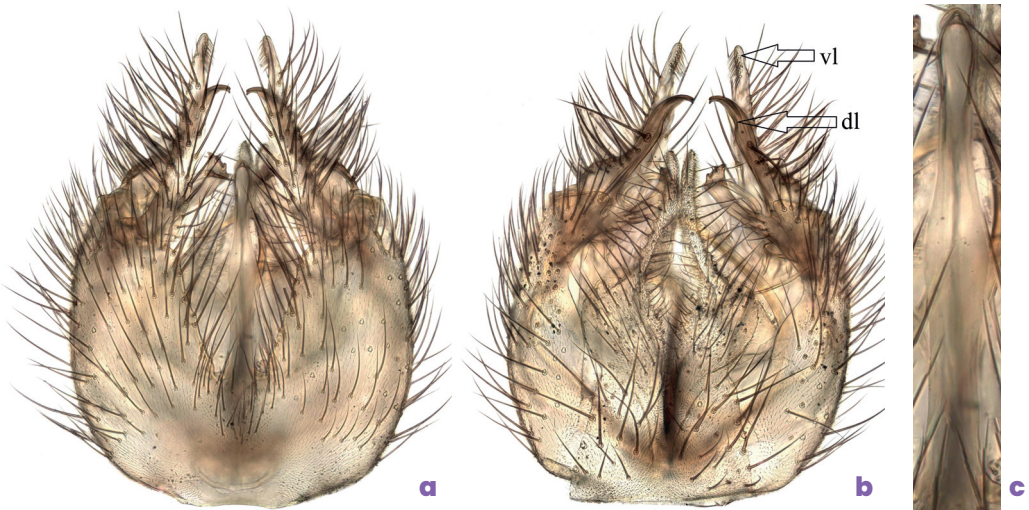


Figure 160. *Exechiopsis jenkinsoni*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) hypandrial lobe.

- Gonostylus with dorsal lobe (arrowed as dl) broad and pointed medially on apical margin. [Mesonotum with more or less fused dark stripes, yellow on humeral area and laterally; yellow apical triangles on tergites 2–4 in male, all tergites in female] ... *pulchella* (Winnertz, 1864) (p. 187)

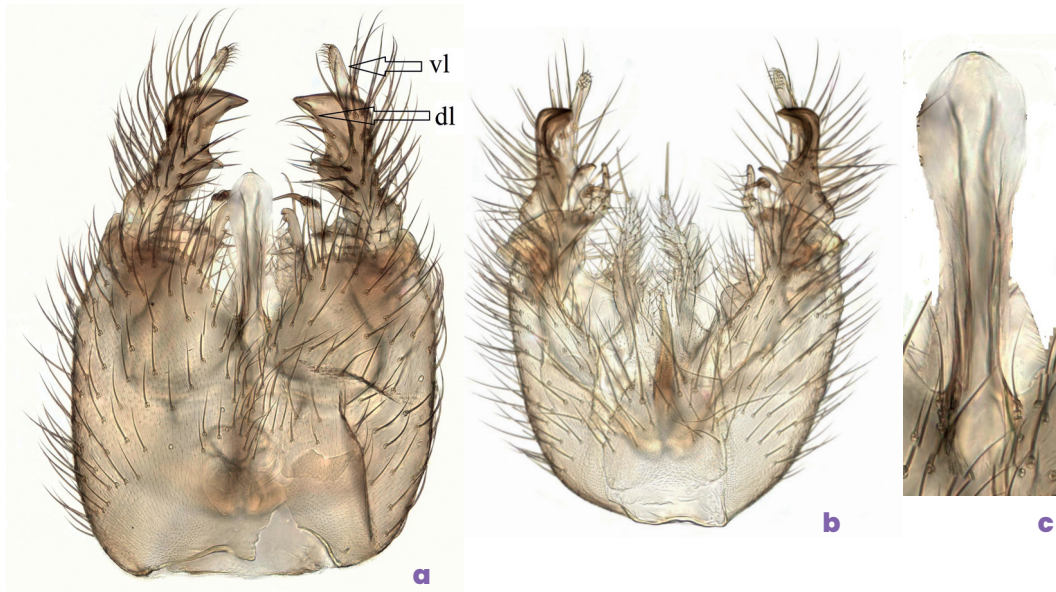


Figure 161. *Exechiopsis pulchella*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) hypandrial lobe.

Species notes

Exechiopsis (sensu stricto) *clypeata* (Lundström, 1911)

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man. Widespread in Europe.

Habitat. Woodland.

Biology. No British records. Other records: *Mycena galericulata* (Kurina 1991, Estonia), *Suillus bovinus* (Russian record cited by Jakovlev 1994), *Asterodon ferruginosus* on a rotten spruce log (Jakovlev 2011, Finland).

Exechiopsis (sensu stricto) *dryaspagensis* Chandler, 1977

Distribution. Scattered records throughout Britain: three from near the south coast of England (Stones Common, Dorset 1993; Brede High Wood, Sussex 2004; Knapp Copse, Devon 2015), several records from N Wales and N England (3 hectads each), and the Scottish Highlands (5 hectads). Widespread in W, C and N Europe.

Habitat. Woodland, especially wet woods with streams.

Biology. Unknown.

Exechiopsis (sensu stricto) *dumitrescae* (Burghele-Balacesco, 1972)

Distribution. Widespread throughout Britain, with most records from SW England and Wales, widespread in Scotland including Skye. Three Irish records (Killarney, Co Kerry, 11.vii.1990; Charleville Wood, Co Westmeath, 19.ix.1999; Belvoir Park Forest, Co Down, 2.x.2019). Palearctic, widespread in Europe.

Habitat. Woodland, especially wet woods with streams.

Biology. No British records. Other records: undetermined saproxylic agarics (Zaitzev 2003).

Exechiopsis (sensu stricto) *fimbriata* (Lundström, 1909)

Distribution. Widespread in Britain, with an even scatter of records, and a recent increase in frequency. Deady (2012, 2013) recorded it from Ireland (Carrigagulla Wood, Co Cork, x. 2010). Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. Reared several times from stems of the terrestrial agaric *Laccaria laccata*. **British records:** *Laccaria laccata* (Trifourkis 1977). **Other records:** *Laccaria laccata*, in stem (Kurina 1991, Ševčík 2006 and 2010). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Exechiopsis (sensu stricto) *forcipata* (Lackschewitz, 1937)

Distribution. One male was found at the west end of Loch Morlich on 8 September 2013 (Chandler 2014). Palearctic, widespread but mainly northern in Europe with records from Scandinavia, Germany, Poland and Austria, and in Russia from Karelia, the Altai and the Far East Primorye region (Zaitzev 2003).

Habitat. Found beside a wooded stream, near where it flowed into the Loch.

Biology. Unknown.

Exechiopsis (sensu stricto) furcata (Lundström, 1911)

Distribution. Widely distributed but uncommon in the Scottish Highlands (11 hectads) with a few records in N England (3 hectads) and one from N Wales (Trawscoed, vi.2017, A. & J. Graham). Widespread in Europe.

Habitat. Near streams in woodland and in montane habitats.

Biology. Unknown.

Exechiopsis (sensu stricto) hammi (Edwards, 1925)

Distribution. Widespread in Britain but scarce in the south-east; a greater number of older records due to being well recorded in the 1980s Welsh and East Anglian wetland surveys. Widespread in Ireland, but only three records (Glencar waterfall, Co Leitrim, 1970; Devil's Glen, Co Wicklow, 1980; Moy, Co Tyrone, 1985). Palearctic, widespread in Europe.

Habitat. Damp woodland and wetlands, including floating fen and bogs.

Biology. Unknown.

Exechiopsis (sensu stricto) indecisa (Walker, 1856)

Distribution. Frequent throughout Britain, and especially common in the Scottish Highlands, with a concentration of records in the Spey valley and E Ross. One Irish record (Erriff River, Co Mayo, 1985, Chandler). Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. Rearing records are mainly from boletes (*Boletus* and *Suillus* spp); there is also a record from *Lactarius torminosus*, but some from other agarics require confirmation.

British records: *Suillus bovinus*, *S. flavidus* (Edwards 1925, Madwar 1937). **Other records:** *Lactarius torminosus*, *Suillus bovinus*, *S. grevillei*, *S. luteus*, *S. variegatus*, *Xerocomus subtomentosus* (Jakovlev 1994, his rearings from Karelia); many records from *Boletus* and *Suillus* spp (Eisfelder 1955, Hackman and Meinander 1979, Kurina 1991).

Exechiopsis (sensu stricto) intersecta (Meigen, 1818)

Distribution. Frequent throughout Britain; widespread in Ireland. Widespread in Europe.

Habitat. Woodland.

Biology. **British records:** *Tricholoma saponaceum* (Chandler 1978b, requires confirmation). **Other records:** *Mycena* sp. (Ševčík 2006 and 2010, Czech Republic).

Exechiopsis (sensu stricto) jenkinsi (Edwards, 1925)

Distribution. A scattered and apparently disjunct distribution with records from S England and N Wales (together 17 hectads), and then several records in the Scottish Highlands (7 hectads). Two Irish records (in the same hectad) from Co Wicklow (Glendalough, 1968; Derrybawn, 1984). Widespread in C and S Europe, not recorded from the Nordic region.

Habitat. Woodland.

Biology. Unknown.

***Exechiopsis (sensu stricto) ligulata* (Lundström, 1913)**

Distribution. Widespread throughout Britain, with most records in Wales, Cumbria and Scotland, but also scattered records elsewhere in England, especially from SW England through to the Weald. Widespread in Europe.

Habitat. Broad-leaved and coniferous woodland.

Biology. Unknown.

***Exechiopsis (sensu stricto) magnicauda* (Lundström, 1911)**

Distribution. Local in S England, with records in the Cotswolds predominating; otherwise an old record for Bucks (Stokenchurch, 1907) and more recent records for Berks (Windsor Forest, 1987, 1999), Bucks (Burnham Beeches, 1996, 1999 and 2001), Hereford (Humber Carr Wood, 1998) and most recently the New Forest, Hants (Pondhead Inclosure and Denny Wood, 9–10.vi.2019, I. Perry). Widespread in Europe.

Habitat. Broad-leaved woodland; most sites are ancient beech woodland.

Biology. Unknown.

***Exechiopsis (sensu stricto) pseudindecisa* Laštovka & Matile, 1974**

Distribution. Widely scattered in Britain (16 hectads); it may be under-recorded due to earlier confusion with *E. indecisa*, though most records are older museum specimens and the most recent record is from Wales (Craig Cerrig Gleisiau, 13.v.2011, A. Stubbs), a previous Welsh record in 2006, a Yorks record in 2002 and three Scottish records in 2000. Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown, but possibly some earlier rearing records of *E. indecisa* may refer to it.

***Exechiopsis (sensu stricto) pulchella* (Winnertz, 1864)**

Distribution. Widespread in Britain, with clusters of records in SE and SW England, Wales and N England, but it is commonest in Scotland; several Irish records. Widespread in Europe.

Habitat. Broad-leaved and coniferous woodland.

Biology. **No British records. Other records:** *Asterodon ferruginosus* on decayed spruce log, *Baltazaria* (as *Scytinostroma*) *galactina* on moist decayed birch wood (Jakovlev 2011, Finland). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Exechiopsis (sensu stricto) subulata* (Winnertz, 1864)**

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man. Palearctic, widespread in Europe.

Habitat. Broad-leaved and coniferous woodland.

Biology. **No British records. Other records:** *Suillus variegatus* (Jakovlev 1994, Russia; cited in error as *Xerocomus* [= *Boletus*] *subtomentosus*), *Asterodon ferruginosus* on decayed spruce log (Jakovlev 2011, Finland).

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***Exechiopsis* (sensu stricto) *unguiculata* (Lundström, 1911)**

Distribution. Common in the north and west, including Wales and Scotland, but less common in the south-east. Irish records are from one hectad in Co Kerry (Derrycunihy Cascade, 16.x.1973; Monk's Wood, Muckcross, 4-8.v.1981). Palearctic, widespread in Europe.

Habitat. Damp woodland and wetlands, including floating fen and bogs.

Biology. Unknown.

Subgenus *Xenexechia* Tuomikoski

Usually smaller species than *Exechiopsis* sensu stricto. Hind tibia with dorsal excavation absent or poorly developed and apical margin not conspicuously oblique. Vein R_{4+5} not markedly downturned apically and more or less parallel with vein M_1 . Wing length 3.0–4.0 mm.

Male genitalia with sternite 9 not so differentiated as in *Exechiopsis* sensu stricto; hypandrial lobe small or absent. Female with cercus two-segmented.

There are 12 species recorded from Europe, of which 6 are found in Britain. Five of these are among the 6 species keyed by Zaitzev (2003) under *Xenexechia*; he keyed the sixth *E. seducta* under *Exechia*. Zaitzev described and keyed *E. davatchii* and *E. seducta* as having 2 proepisternals but only one is present in all material examined of these species. At present only males can be identified for most species. As with *Exechiopsis* sensu stricto, the character of the relative lengths of crossvein r-m and the stem of the median fork used by Zaitzev is unreliable due to variation within species. Coloration is summarised within square brackets in key couplets.

Key to subgenus *Xenexechia* Tuomikoski

1. Proepisternum with 2 bristles. Gonostylus with ventral lobe broadly rounded apically and medially notched. [Mesonotum grey dusted; male tergites 2-4 yellow apically, 5-6 all dark, genitalia yellow] 2
- Proepisternum with 1 bristle. Gonostylus with ventral lobe not notched medially on either face 3
2. Gonostylus with ventral lobe notched on external face and dorsal lobe bluntly rounded apically (arrowed respectively as dl and vl) *leptura* (Meigen, 1830) (p. 192)
- Gonostylus with ventral lobe notched on internal face and dorsal lobe tapered apically (arrowed respectively as dl and vl) *membranacea* (Lundström, 1912) (p. 192)

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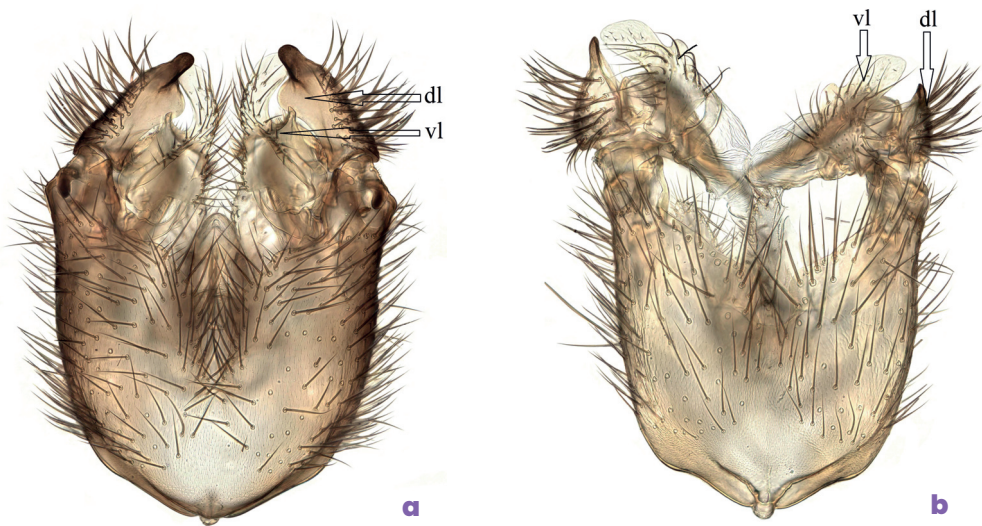


Figure 162. Ventral view of ♂ genitalia: (a) *Exechiopsis leptura*; (b) *Exechiopsis membranacea*.

3. Gonostylus much shorter than gonocoxites with ventral lobe shallowly notched apically; medial lobe with two spinose bristles, the longer one bent apically (both lobes arrowed). [Mesonotum brownish; male tergites 2-4 yellow basally; female not recognised] *seducta* Plassmann, 1976 (p. 192)
- Gonostylus nearly as long as or longer than gonocoxites, with ventral lobe slender and not notched apically. [Tergites with yellow markings on apical margins] 4



Figure 163. *Exechiopsis seducta*: (a) ventral view ♂ genitalia; (b) gonostylus, (vl and ml = ventral and medial lobes of gonostylus).

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4. Gonostylus longer than gonocoxites, with ventral lobe (vl) slender, dorsal lobe (dl) broad and bearing a hooked internal process; medial lobe (ml) with 2 spinose bristles (all lobes arrowed). Gonocoxites with hypandrial lobe bifurcate apically. [Mesonotum grey dusted; tergites 2-4 narrowly yellow on apical margins] *pollicata* (Edwards, 1925) (p. 192)
- Gonostylus not longer than gonocoxites. Gonocoxites with hypandrial lobe not bifurcate apically. [Mesonotum brown dorsally, yellow laterally] 5

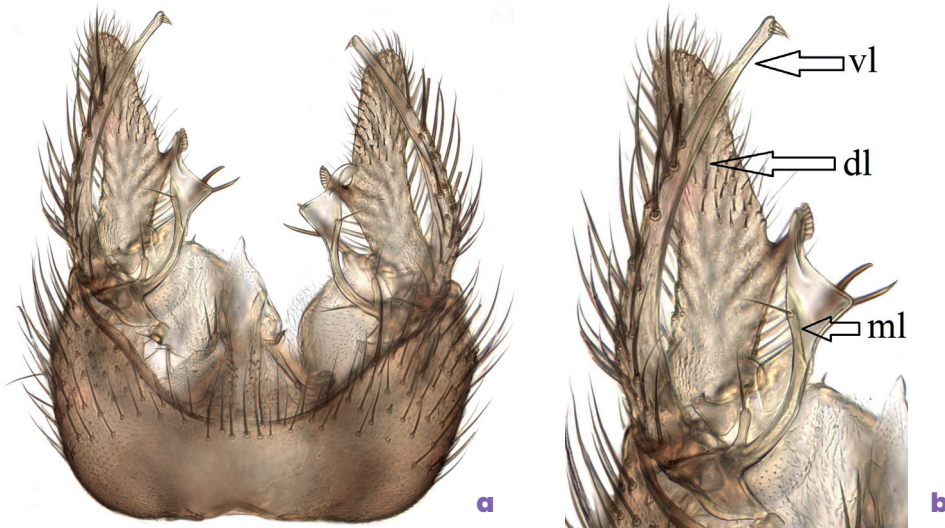


Figure 164. *Exechiopsis pollicata*: (a) ventral view ♂ genitalia and (b) gonostylus.

5. Gonostylus with ventral lobe blunt and bearing a brush of fine bristles apically (arrowed). Gonocoxites with hypandrial lobe bearing a short subapical process on each side of a central process (arrowed). [Tergites 1-4 (male) or 1-5 (female) with yellow apical triangles] *crucigera* (Edwards, 1925) (p. 191)
- Gonostylus with ventral lobe tapered to a point and bearing a single long bristle apically and two other long bristles subapically (all lobes arrowed). Gonocoxites with hypandrial lobe short and rounded apically without any processes. [Male tergites 1-5 yellow apically, genitalia brownish yellow; female not recognised] *davatchii* (Matile, 1969) (p. 191)

Handbooks for the Identification of British Insects: Fungus Gnats

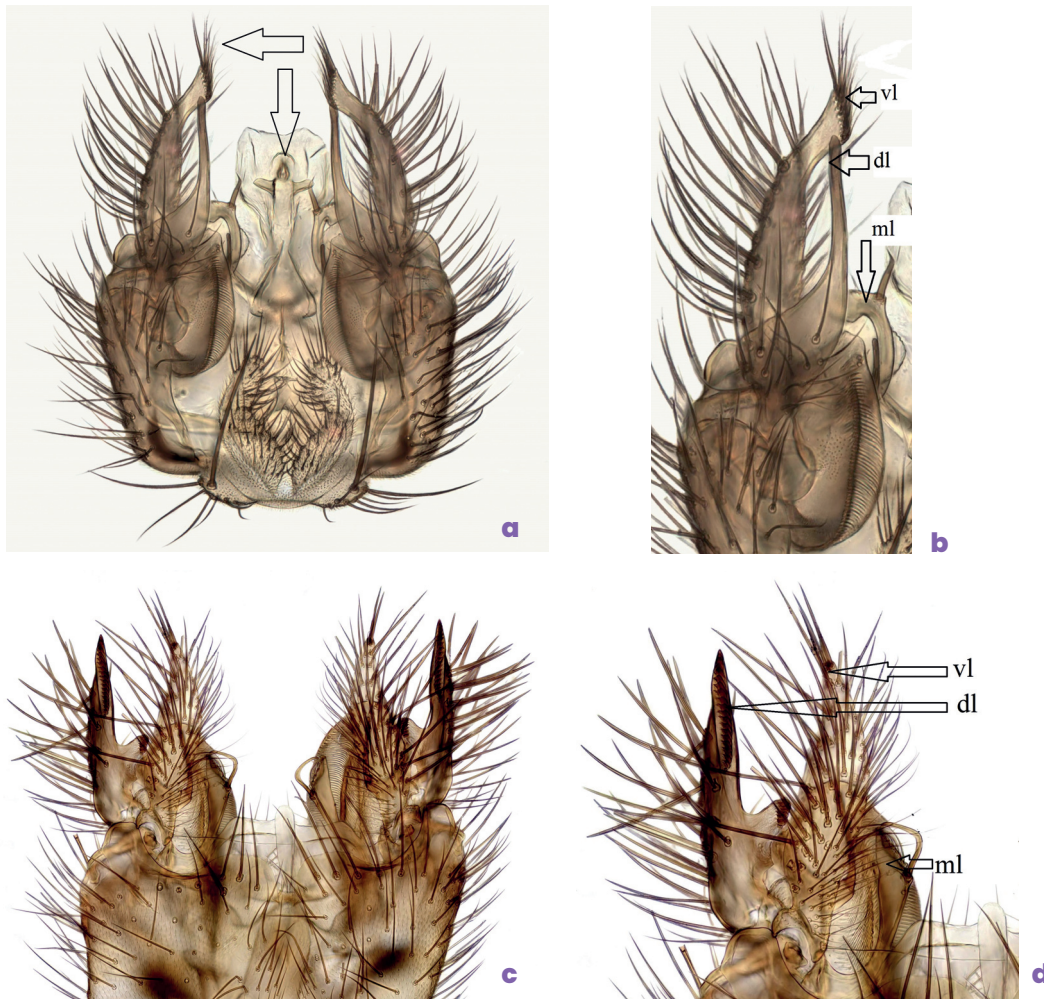


Figure 165. *Exechiopsis crucigera*: (a) dorsal view of ♂ genitalia; (b) gonostylus. *Exechiopsis davatchii*: (c) ventral view of ♂ genitalia; (d) gonostylus (vl, dl and ml = ventral, dorsal and medial lobes of gonostylus).

Species notes

***Exechiopsis (Xenexechia) crucigera* (Lundström, 1909)**

Distribution. Widespread in Britain, most frequent in S England and East Anglia, and with a recent increase in records, only 6 records are pre-1960. Widespread in Europe.

Habitat. Damp woodland and wetlands.

Biology. Unknown.

***Exechiopsis (Xenexechia) davatchii* (Matile, 1969)**

Distribution. This may be a recent arrival in Britain that has spread rapidly. First recorded in Britain in 2010 at Brandon Country Park, Suffolk (Chandler and Perry 2011). It has since

been found at the Warburg Reserve, Bix Bottom, Oxon (2011), Hardwick Hall, Derbyshire (2012), Briddlesford Copses, Isle of Wight (2012), Old Sulehay Forest, Northants (2016), Flitwick Moor, Beds (2016), Poynings, Sussex (2016), Mitcham Common, Surrey (2017), Cloutsham Ball, Somerset (2018), Crickley Hill, Gloucs (2019), and Cothill, Berks V.C. (2019). Palearctic, widespread but scarce in Europe.

Habitat. British records are from broad-leaved woodland, woodland edge, old hedges and parkland.

Biology. Unknown.

Exechiopsis (Xenexechia) leptura (Meigen, 1830)

Distribution. Common throughout Britain; widespread in Ireland. Palearctic, widespread in Europe.

Habitat. Broad-leaved and coniferous woodland.

Biology. **British records:** reared from the resupinate, anamorphic stage of *Botryobasidium aureum* (R. Fortey; Fortey and Chandler 2021). **Other records:** Jakovlev (2011) reported that it has been found in an emergence trap over dead wood.

Exechiopsis (Xenexechia) membranacea (Lundström, 1912)

Distribution. Widespread in England north to Yorks, with a few records in the Scottish Highlands (4 hectads). The first British records were from Monks Wood NNR, Hunts (1972) and Leckford, Hants (1979). It was recorded more widely from the 1980s onwards and has become more numerous in the south in recent years. Widespread in Europe.

Habitat. Woodland, carr and wetlands.

Biology. Unknown.

Exechiopsis (Xenexechia) pollicata (Edwards, 1925)

Distribution. Widespread in Britain with most records (36 hectads) from the south of England and Wales, and from N England (10 hectads), with a few Scottish records (4 hectads). Most records are of single individuals. Palearctic, widespread in Europe.

Habitat. Wooded habitats, but a number of records are from urban and suburban situations suggesting that it may occur in garden habitats.

Biology. Unknown.

Exechiopsis (Xenexechia) seducta (Plassmann, 1976)

Distribution. This may be another recent arrival in Britain. The first British records (Gibbs 2009, Chandler and Perry 2011) were from two sites nearly 6km apart within the same hectad (Elveden Centerparc, 2008; Brandon Country Park, 2010, 2011, 2019, 2020). Both sites adjoin Thetford Forest, a largely coniferised area of former Breckland. It has also been found at Ockham Common, Surrey (2013), Flitwick Moor, Beds (2014), Clumber Park, Notts (2015), Snipe Dales, Lincs (2016), Winterfold Wood, Surrey and Fleet Pond, Hants (2017) and Besselsleigh Wood, Berks V.C. (2020). Widespread in C and N Europe.

Habitat. Broad-leaved woodland.

Biology. Unknown.

Genus *Myrosia* Tuomikoski

Slender but robust-bodied gnats with slender antennae and long but relatively thick legs. Coloration as for species, with pale abdominal markings broadest along hind margins of tergites, legs yellow. Clypeus higher than broad, more or less ovate. Mesonotum clothed with dark setulae and bearing well developed bristles in dorsocentral rows. Anepisternum with dark setulae. Two pairs of strong scutellar bristles (the lateral pair shorter) and 3 or 4 proepisternal bristles. Vein Sc ending in R. Crossvein r-m about twice as long as stem of median fork, r-m and bm-m bare. Base of posterior fork well before or sometimes opposite base of stem of the median fork. Fork veins setulose only on apical part. False vein weak but extending to about middle of posterior fork. CuP strong and reaching beyond level of base of posterior fork. Hind coxa with two dark posterobasal bristles, the upper one shorter, fine short setulae in line on rest of coxa. Hind tibia with a few short posterior bristles near tip. Hind tibial spurs more than half as long as tarsomere I. Wing length 3.5–4.5 mm.

Male genitalia large with a shallow ventral excavation of the gonocoxites, enclosing a small medially constricted hypandrial lobe. Tergite 9 with one pair of long and several shorter bristles. Female cercus two-segmented; tergite 7 a little longer than corresponding sternite.

There is a single described European species, with a second recognised in the Nordic region (Kjærandsen and Søli 2020). Another Palaearctic species, *M. orientalis* (Zaitzev, 1993) from Sakhalin, is keyed by Zaitzev (2003), differing in the structure of the male genitalia.

Species note

Mesonotum yellow with three fused dark brown stripes. Abdomen dark brown, with large yellow markings on tergites 2–4. Genitalia large, yellow *maculosa* (Meigen, 1818)



Figure 166. *Myrosia maculosa*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) hypandrial lobe.

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***Myrosia maculosa* (Meigen, 1818)**

Distribution. Widespread in England and the eastern half of Wales (together 25 hectads, only 7 post-2000), but with only three Scottish records (River Findhorn, 1982; Tarradale, 1984; Milltown, 1996). Palearctic, widespread in Europe.

Habitat. Wooded habitats, but a number of records are from urban and suburban situations, suggesting that it may occur in garden habitats.

Biology. British records: *Coprinopsis atramentaria* (P. Chandler). **Other records:** a German record from a *Cortinarius* species (Eisfelder 1955).

Genus *Notolopha* Tuomikoski

Slender but robust-bodied gnats with long but relatively thick legs. Coloration as for species, with pale abdominal markings broadest along hind margins of tergites, legs yellow. Antennae with flagellomeres short, barely as long as broad and bearing short stiff bristles. Clypeus higher than broad, more or less ovate. Mesonotum clothed with pale setulae and with well-developed black bristles in dorsocentral rows; these are thick and blunt (arrowed) in the single British species, but not thickened in the other two European species. Anepisternum bare. Two pairs of strong scutellar bristles and 3 or 4 proepisternal bristles. Vein Sc ending free. Crossvein r-m longer than stem of median fork. Base of posterior fork well before base of stem of the median fork. Fork veins setulose on greater part; stem of median fork, r-m and bm-m bare. False vein weak but extending to about middle of posterior fork. CuP strong and reaching beyond level of base of posterior fork. Hind coxa with a single dark posterobasal bristle, setulae in succeeding row minute and pale. Hind tibial spurs more than half as long as tarsomere I. Wing length 4.0–4.5 mm.



Figure 167. *Notolopha cristata* (a), (b) ♂, (c) thoracic bristles.

Male genitalia large with a deep ventral excavation of the gonocoxites, enclosing a narrow hypandrial lobe. Tergite 9 without long bristles. Female cercus two-segmented; tergite 7 distinctly longer than corresponding sternite.

There are 3 European species (Zaitzev and Maximova 2000, Zaitzev 2003), of which 2 (both also recorded from Siberia) are known in Europe only from Scandinavia. They differ from the British species in having unmodified bristles on the mesonotum and in the structure of the male genitalia.

Species note

Mesonotum dark brown, with yellow humeral and lateral areas; short, strong and often blunt bristles, forming two dorsocentral series (arrowed in dorsal view of thorax). Abdomen dark brown with yellow lateral spots on tergites 2-4. Genitalia yellow *cristata* (Staeger, 1840)



Figure 168. *Notolopha cristata*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) hypandrial lobe.

Notolopha cristata (Staeger, 1840)

Distribution. Common in SW England, Wales, N England and Scotland, but rare elsewhere in England, with only three records in the south-east, all in Buckinghamshire (Wormsley Park and Stokenchurch, both 1907, G.H. Verrall; Burnham Beeches, 31.v.1977, Chandler). Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. It develops mainly in terrestrial agarics but also recorded from the saproxylic sulphur tuft *Hypholoma fasciculare*. **No British records. Other records** *Hypholoma fasciculare*, *Lactifluus piperatus*, *Marasmius oreades*, *Megacollybia platyphylla*, *Stropharia hornemannii*, *Tricholoma album* (Russian records cited by Jakovlev 1994, except for *Lactifluus* and *Tricholoma* his own rearings from Karelia).

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Genus *Pseudexechia* Tuomikoski

Slender mainly dark gnats with long and slender legs. Mesonotum may be all dark or with three stripes on a lighter (grey or yellow) ground, paler markings when present on abdomen broadest along hind margins of tergites; legs yellow. Clypeus ovate. Mesonotum with strong bristles only near margins. Anepisternum bare. One pair of strong scutellar bristles and 2 proepisternal bristles. Vein Sc ending in R. Stem of median fork subequal to crossvein r-m. Base of posterior fork beyond that of median fork, the veins of both forks usually bare. Hind tibia with a series of short posterior bristles near tip. Wing length 2.5–4.0 mm.

Male genitalia with deep ventral excavation of gonocoxites containing a long hypandrial lobe; cerci with small rounded internal lobe. Female cercus one or two-segmented.

There are 9 species recorded from Europe, of which 6 are known from Britain. Three of the latter are among the 8 species keyed by Zaitzev (2003). Kjærandsen *et al.* (2007b), however, noted that the species figured as *P. trisignata* (Edwards) by Zaitzev (*op. cit.*) was *P. pectinacea* (Ostroverkhova, 1979), listed by him as an unrecognised species of *Rymosia* in which it was described. They also recorded the allied Nearctic species *P. canalicula* (Johannsen, 1912) from Sweden and Finland. The recognition that these species are present in Europe made it necessary to re-evaluate previous records of *P. trisignata*. Kjærandsen (2009) then fully revised this group of species and distinguished *P. tuomikoskii*, to which the majority of earlier British records of *P. trisignata* have been found to belong. Kjærandsen and Chandler (2006) established the identity of *P. parallela*, described from a female by Edwards (1925), and recognised a related species *P. monica*. Coloration is summarised within square brackets in key couplets.



Figure 169. *Pseudexechia trisignata* ♂.

Key to *Pseudexechia* Tuomikoski

1. Mesonotum mainly dark brown with the stripes fused, so that only side margins and humeral areas are yellowish. Gonostylus small relative to gonocoxites. Female with two-segmented cercus (*parallela*, female of *monica* not examined) 2
- Mesonotum with three distinctly separated stripes (sometimes less discernible in *trisignata*). Gonostylus large relative to gonocoxites (except in *aurivernica*). Female with single-segmented cercus 3
2. Gonostylus with ventral lobe angled and club-shaped, rounded apically (upper arrow). Gonocoxites with hypandrial lobe with apical lobes widely divergent (lower arrow). [Male tergites 2-4 vaguely yellow laterally] *monica* Kjærandsen & Chandler, 2006 (p. 200)
- Gonostylus with ventral lobe broad and pointed apically on dorsal margin. Gonocoxites with hypandrial lobe apically narrowed with apical lobes only narrowly divergent (arrowed). [Male tergites 2-5 yellow laterally] *parallela* (Edwards, 1925)(p. 201)

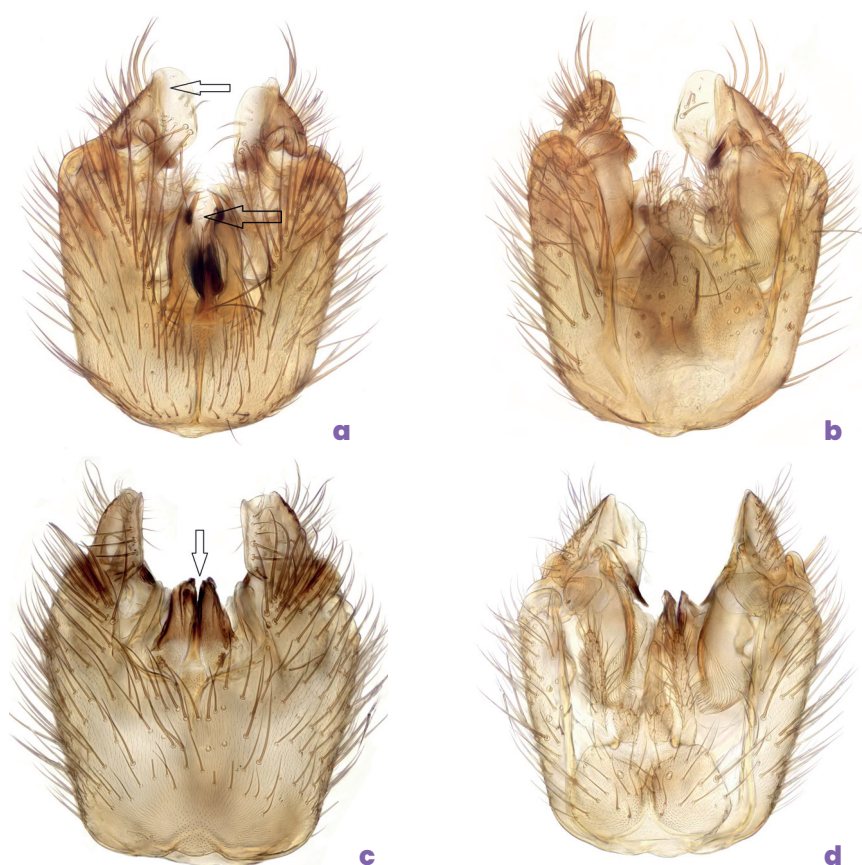


Figure 170. *Pseudexechia monica*: (a) ventral and (b) dorsal view of ♂ genitalia.
Pseudexechia parallela: (c) ventral and (d) dorsal view of ♂ genitalia.

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3. Vein R_{4+5} almost straight, reaching costa nearer to R_1 than to M_1 . Base of posterior fork distinctly more than length of stem of median fork beyond the base of that fork. Gonostylus without apically expanded blunt bristles on ventral lobe 4
- Vein R_{4+5} distinctly downcurved, reaching costa nearer to M_1 than to R_1 . Base of posterior fork only about length of stem of median fork beyond the base of that fork. Gonostylus with broad spatulate ventral lobe bearing apically expanded blunt bristles (right arrows in figure of gonostylus for *P. trisignata*). Female tergite 7 with lateral bare area apically. [Coloration of mesonotum as in *P. trivittata*, though *P. trisignata* may have the stripes less distinct; tergites 2-5 with more or less indistinct pale apical bands] 5
4. Mesonotum dull yellow with three dark brown stripes. Abdomen with broad lateral triangles on all tergites, forming nearly complete apical bands. Gonostylus small relative to gonocoxites, with ventral lobe broader apically and shorter dorsal lobe with a fan-like internal process bearing an apical comb (arrowed). Female tergite 7 with strongly dentate but not angled apical margin, with lateral bare area apically *aurivernica* Chandler, 1978 (p. 200)



Figure 171. *Pseudexechia aurivernica*: (a) ventral and (b) dorsal view of ♂ genitalia.

- Mesonotum grey, sometimes more yellowish laterally, with three slightly shining black stripes. Male abdominal coloration variable, side margins of tergites 2-5 usually yellow, extended dorsally on hind margins of 3-5, but may be reduced to triangles on these tergites. Gonostylus subequal in length to gonocoxites with ventral lobe not enlarged but bearing a group of small bristles apically (arrowed), and dorsal lobe longer and slender apically without a fan-like internal process. Female tergite 7 with angled margin in lateral view, evenly covered with bristles *trivittata* (Staeger, 1840)(p. 201)



Figure 172. *Pseudexechia trivittata*: (a) ventral view of ♂ genitalia and (b) gonostylus.

5. Spatulate ventral lobe of gonostylus with angular basal corner, so that it is broadest basally (arrowed in ventral view, and left arrow in figure of gonostylus indicates its basal margin); bare apical part of dorsal lobe evenly thick. Female tergite 7 with more scalloped apical margin, shallowly excavated dorsally *trisignata* (Edwards, 1913) (p. 201)
- Spatulate ventral lobe of gonostylus with basal corner rounded (arrowed), so it is broadest medially; bare apical part of dorsal lobe slightly dilated. Female tergite 7 not excavated dorsally, with stronger bristles on apical margin *tuomikoskii* Kjærandsen, 2009 (p. 201)

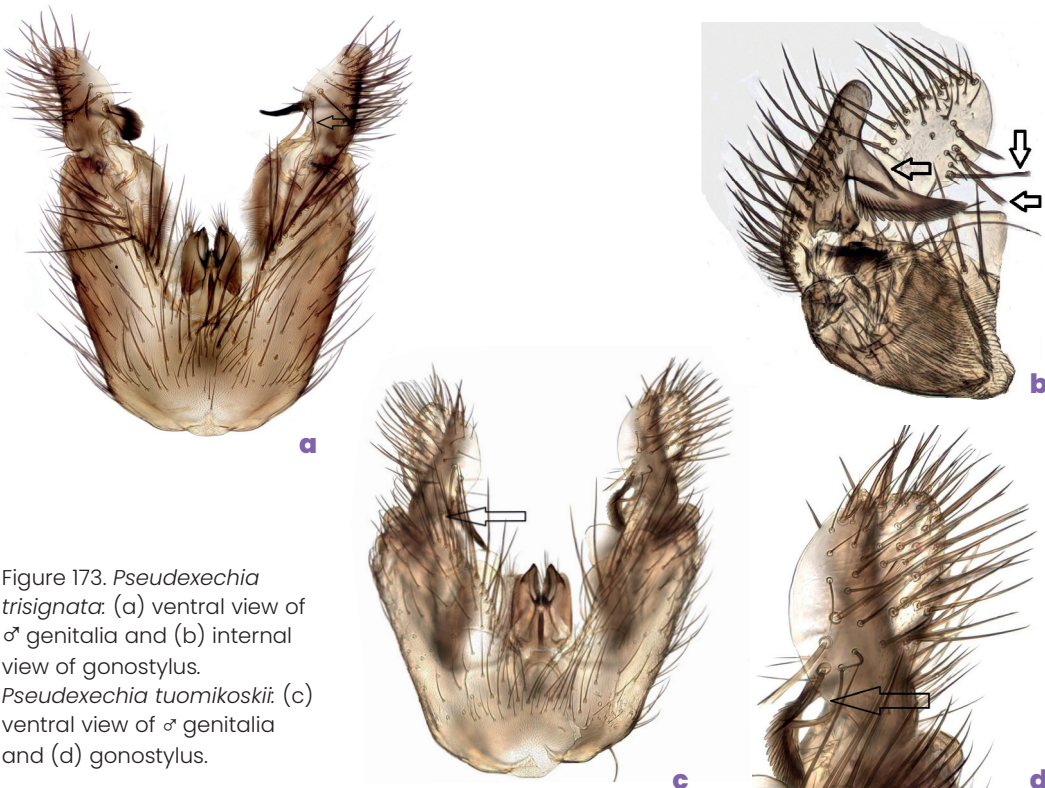


Figure 173. *Pseudexechia trisignata*: (a) ventral view of ♂ genitalia and (b) internal view of gonostylus. *Pseudexechia tuomikoskii*: (c) ventral view of ♂ genitalia and (d) gonostylus.

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Figure 174. Hypandrial lobes of *Pseudexechia*: (a) *monica*; (b) *parallela*; (c) *aurivernica*; (d) *trivittata*; (e) *trisignata*; (f) *tuomikoskii*.

Species notes

Pseudexechia aurivernica Chandler, 1978

Distribution. Frequent in the north and west, including Scotland, N England, Wales and SW England, reaching several sites in Gloucs and Savernake Forest, Wilts but absent from most of S England and East Anglia; widespread in Ireland. Widespread in Europe.

Habitat. Woodland and woodland edge habitats.

Biology. Unknown.

Pseudexechia monica Kjærandsen & Chandler, 2006

Distribution. Only known from two sites in Anglesey (Cors Erddreiniog, 1988; Cors Bodeilio, 1988 and 1990) (Kjærandsen and Chandler 2006), both of which are NNRs. Otherwise known only from the wooded wetland of Marais de Lavours in France (Withers 2014).

Habitat. *Schoenus* flushes at Cors Erddreiniog and from a reedbed at Cors Bodeilio.

Biology. Unknown.

***Pseudexechia parallela* (Edwards, 1925)**

Distribution. Originally described from a single female from Newmarket, Suffolk in 1888, it was not found in Britain again until wetland surveys in Wales and East Anglia a century later, when it was found at Chippenham Fen, 3 sites in Suffolk, 21 sites in Norfolk and 14 sites in Wales (map, Fig. 8b). As it was frequent in these samples it is concluded that the absence of other records is due to sampling methods and recorder effort in the habitats concerned. The only post-2000 record was when it was found again at Chippenham Fen (1.xi and 3.xi.2007, I. Perry). One Irish record (Ballymacquin, Co Kerry, 10.ix.1983, E.G. Hancock). Widespread in Europe.

Habitat. A range of wetland sites, marshes, fens, reedbeds, amongst *Carex* and *Juncus*, calcareous flushes, wet heaths, and *Molinia* and *Myrica* bogs.

Biology. Unknown.

***Pseudexechia trisignata* (Edwards, 1913)**

Distribution. Widespread in Britain (32 confirmed hectads, 8 of them in Scotland). Most records predate the revision by Kjærandsen (2009), in which this was recognised to be a species complex, of which at least two members occur in the British Isles and *P. tuomikoskii* is the commoner species in Britain, where both species are widespread. One confirmed Irish record (Clandeboy Estate, Co Down, 2019) and one from the Isle of Man (Glen Maye, 2020). Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. **British records:** *Kuehneromyces mutabilis*, *Hebeloma pseudoamarens* (Chandler 1993b, require confirmation since the revision of this species group, as they may refer to *P. tuomikoskii*).

***Pseudexechia trivittata* (Staeger, 1840)**

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man. Palaearctic, widespread in Europe, also in the Atlantic islands.

Habitat. Woodland and open habitats.

Biology. Edwards (1925) reported a small swarm of males hovering over old horse dung; it appears that fungi growing on it were the attraction and the reference by Chandler (1978b) to visiting *Coprinus* spp. probably relates to one of the coprophilous fungi formerly in *Coprinus* but now in Psathyrellaceae, e.g. *Coprinellus*. **British records:** *Panaeolus papilionaceus*, *Psathyrella candolleana* (Chandler 1993b), *Parasola conopilea* (R. Fortey; Fortey and Chandler 2021); adults of this and *P. tuomikoskii* around *Coprinellus micaceus* (Chandler). **Other records:** *Coprinopsis radicans* (Jakovlev 1994, source not stated; in error as *Coprinellus radians* in Chandler 2010b), *Psathyrella candolleana* (Ševčík 2010).

***Pseudexechia tuomikoskii* Kjærandsen, 2009**

Distribution. This species was first recognised quite recently (Kjærandsen 2009) as a member of a species complex previously confused under *P. trisignata*, of which at least two members occur in the British Isles and *P. tuomikoskii* is the commoner species in Britain. Common throughout Britain. Irish records are yet to be reconciled. Widespread in Europe, also in N Africa.

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Habitat. Woodland.

Biology. Till recently unrecorded, but see under *P. trisignata*. **British records:** *Parasola conopilea*, *Psathyrella piluliformis* (R. Fortey; Fortey and Chandler 2021).

Genus *Pseudobrachypeza* Tuomikoski

Coloration as species, slender bodied with slender legs and antennae, all flagellomeres longer than broad in both sexes. Clypeus rounded. Mesonotum with bristles reduced or absent except near margins. Anepisternum with short dark bristles. Two pairs of strong scutellars, 3 proepisternals. Vein Sc ending free. Base of posterior fork well before that of the median fork. Fork veins setulose. False vein behind CuA very long and distinct, reaching beyond middle of posterior fork. Hind tibia with posterior bristles on most of its length, stronger on basal half. Hind tibial spurs less than half length of tarsomere 1. Wing length 3.5–4.5 mm.



Figure 175. *Pseudobrachypeza helvetica*. (a) ♂ and (b) ventral view of ♂ genitalia.

Male genitalia with deep ventral excavation of gonocoxites, containing a long hypandrial lobe. Female cercus two-segmented.

There is a single widespread Palaearctic species.

Species note

Mesonotum brown with yellow lateral areas. Abdomen dark brown with large yellow lateral spots on tergites 2–6, widest on hind margins. Legs yellow; male fore tarsus with long bristles beneath, especially on second tarsomere, and third tarsomere enlarged below and bearing a row of blunt spinules near the base of the anterior face
..... *helvetica* (Walker, 1856)

Pseudobrachypeza helvetica (Walker, 1856)

Distribution. Common throughout Britain; a few widespread Irish records. Palaearctic, widespread in Europe.

Habitat. All types of woodland.

Biology. **No British records.** **Other records:** Reared from a wet layer under inner side of bark bearing both fertile and sterile tissues of *Resinicium bicolor* (Jakovlev 2011, Finland).

Genus *Pseudorymosia* Tuomikoski

Slender bodied gnats with slender antennae and long slender legs. Coloration as for species, with pale abdominal markings situated towards bases of tergites, legs yellow. Clypeus short and transverse, broader than high. Anepisternum with short scattered dark bristles. Two pairs of strong scutellar bristles and 2 proepisternal bristles. Vein Sc ending free. Base of posterior fork well before or sometimes opposite that of base of stem of the median fork. Fork veins setulose; stem of median fork, r-m and bm-m bare. False vein weak but extending to about middle of posterior fork. CuP strong and reaching beyond level of base of posterior fork. Front tarsomere 1 about 1.5 x as long as its tibia and hind tibial spurs distinctly less than half as long as their tarsomere 1. Hind coxa with one strong posterobasal bristle, with a succeeding row of moderately long fine setulae, and with one similar setula basal to it. Hind tibia with a row of short posterior bristles near tip. Wing length 3.5–4.0 mm.

Male genitalia large with gonocoxites having only a small median excavation ventrally, flanked by a pair of short slender submedian processes; tergite 9 with two pairs of moderately long bristles and cerci double. Female cercus two-segmented; sternite 8 with short broad lobes, not bearing strong marginal bristles.

Two Palaearctic species have been recognised but the second species *P. optiva* (Dziedzicki, 1910) is of uncertain status. Zaitzev (2003) noted that the character of number of proepisternal bristles (3 in *fovea*, 1–2 in *optiva*) used to separate them was not reliable as specimens he had studied of *P. fovea* had only 2 bristles.

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Species note

Mesonotum dark brown with small yellow humeral spots. Abdomen dark brown with yellow lateral spots on tergites 2–5. Genitalia yellow. Legs yellow *fovea* (Dziedzicki, 1910)



Figure 176. *Pseudorymosia fovea* ventral view of ♂ genitalia.

Pseudorymosia fovea (Dziedzicki, 1910)

Distribution. Northern and western, extending from the Forest of Dean northwards, with scattered records in Wales and N England, most frequent in Scotland, with a recent increase in records (map, Fig. 5b). One Irish record (Knocksink Wood, Co Wicklow, 5.x.1980). Palearctic, widespread in Europe.

Habitat. Most records are from damp broad-leaved or mixed woodland.

Biology. No British records. Other records: *Tricholoma fulvum* (Eisfelder 1955, Germany), *Asterodon ferruginosus* on a strongly decayed, moss-covered spruce log (Jakovlev 2011, Finland).

Genus *Rymosia* Winnertz

Slender bodied gnats with slender antennae and legs. Mesonotum brown dorsally, with more or less distinct stripes, paler laterally; pale abdominal markings if present broadest on basal margins of tergites. Legs yellow, sometimes with dark markings on coxae or femora. Clypeus ovate. Mesonotum with black bristles in dorsocentral rows in most species. Anepisternum bare or with scattered small bristles. Mediotergite often with short decumbent setulae medially. One pair of strong scutellar bristles and 1–2 proepisternal bristles. Vein Sc ending free, although close to R. Crossvein r-m as long as or longer than stem of median fork. Base of posterior fork well before that of the median fork. Fork veins bare. False vein extending to about middle of posterior fork. CuP strong and reaching beyond level of base of posterior fork. Hind coxa with one strong posterobasal bristle and otherwise only short fine setulae. Hind tibia with short posterior bristles near tip. Hind tibial spurs half or less length of tarsomere 1. Wing length 3.0–4.0 mm.

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Figure 177. *Rymosia fasciata*: (a) ♂ and (b) ventral view of ♂ genitalia.

Male genitalia with gonocoxites fused ventrally with at most a shallow excavation, with hypandrial lobe small or absent. Gonostylus with dorsal lobe often more or less tapering to a slender tip bearing 1 or 2 short spinules. Female cercus one-segmented.

Females can be determined using external characters for some species (as indicated in the key) and the ovipositor structure is often distinctive, but females have not been associated for all species.

There are 32 European species, of which 16 are known from Britain. Of the latter 11 are among the 18 species covered by Zaitzev (2003), though of these *R. spinipes* was omitted from his key.

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Key to *Rymosia* Winnertz

1. Hind femur with broad brown ring near base. Wing with a brown cloud behind CuA. Mesonotum without dorsocentral bristles. One strong and one weaker proepisternal bristles. Male with fore tarsus simple, mesonotum yellow with brown stripes and tergites 2-5 with progressively broader basal bands. Female with basal lateral yellow patches on tergites 2-6 and tergite 7 all yellow *placida* Winnertz, 1864 (p. 213)
- Hind femur all yellow. No cloud behind CuA. Mesonotum with bristles in dorsocentral rows, although these are sometimes small and weak 2

Figure 178. Ventral view of ♂ genitalia: (a) *Rymosia placida*
(b) *Rymosia virens*.



2. Mesonotum with dorsocentral bristles very small. Male fore tarsus simple. Crossvein r-m 1.5-2.0 x long as stem of median fork. Second proepisternal bristle more than half length of first 3
- Mesonotum with dorsocentral rows of bristles well developed 4
3. Tergites 2-5 (male) or 2-6 (female) broadly yellow basally, these markings narrowly divided dorsally. Hind tibia with 5-6 posterior bristles near tip *virens* Dziedzicki, 1910 (p. 214)
- Tergites 2-5 (male) with lateral yellow markings widely separated dorsally [female not seen]. Hind tibia with 7 posterior bristles near tip *acta* Dziedzicki, 1910 (p. 211)
4. Hind tibia with an irregular patch of close-set posterior bristles near tip. Base of posterior fork well before base of crossvein r-m, which is not much longer than stem of median fork. Tergites 2-4 (male) or 2-5 (female) with yellow basal bands, which are narrowed medially. Male fore tarsus (figured) with tarsomere 3 enlarged below and bearing strong bristles *signatipes* (van der Wulp, 1859) (p. 213)

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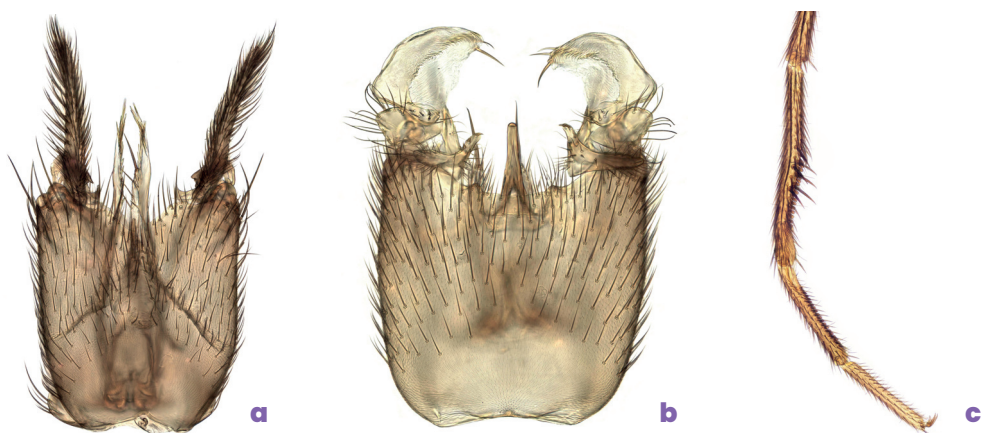


Figure 179. Ventral view of ♂ genitalia *Rymosia*: (a) *acta*; (b) *signatipes*. (c) *Rymosia signatipes* fore tarsus.

- Hind tibia with a row of 3–6 stronger posterior bristles near tip. Crossvein r-m usually longer than stem of median fork 5
- 5. Male fore tarsus with spinules below tarsomere 3, which is slightly thickened 6
- Male fore tarsus without spinules and tarsomere 3 not thickened 9
- 6. Second proepisternal bristle strong, two-thirds or more length of first. Crossvein r-m 2.5–3.0 x stem of median fork. Gonostylus with ventral lobe short and apically pointed (arrowed). Tergites 2–5 (male) or 2–6 (female) with yellow basal bands narrowed in middle, that on tergite 6 in female very narrow in middle *setiger* Dziedzicki, 1910 (p. 213)
- Second proepisternal weak or absent. Crossvein r-m 1.5–2.0 x stem of median fork 7

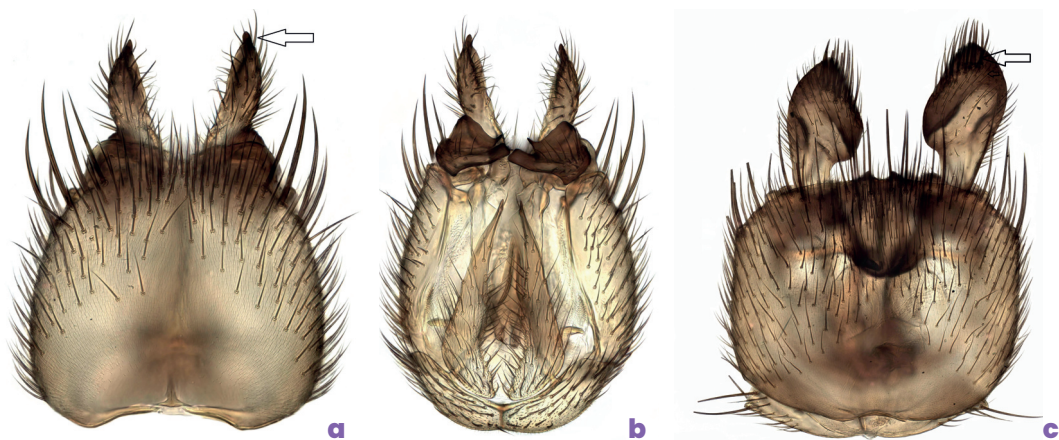


Figure 180. *Rymosia setiger*: (a) ventral and (b) dorsal view of ♂ genitalia. (c) *Rymosia affinis* ventral view of ♂ genitalia.

7. Abdomen with distinct yellow bands on tergites 2-5 (male) or 2-6 (female), which extend narrowly onto hind margins of tergites 1-4 (- 5 in female). Second proepisternal very weak. Gonostylus with ventral lobe broad (arrowed) *affinis* Winnertz, 1864 (p. 211)
- Abdomen with less conspicuous markings and hind margins of all tergites dark. Second proepisternal absent. Gonostylus with ventral lobe narrow 8
8. Gonostylus with ventral lobe long, subequal in length to gonocoxites (arrowed in ventral view); medial lobe deeply bifid (arrowed in dorsal view). Tergites 2 and 3 (sometimes 4) with lateral margin yellowish, extending narrowly along hind margins of tergites 2-3. Coxae clear yellow *bifida* Edwards, 1925 (p. 212)
- Gonostylus with ventral lobe (arrowed) much shorter than gonocoxites. Tergites 2-4 with lateral yellow patches basally. Hind coxa with dark patch medially *spinipes* Edwards, 1925 (p. 214)

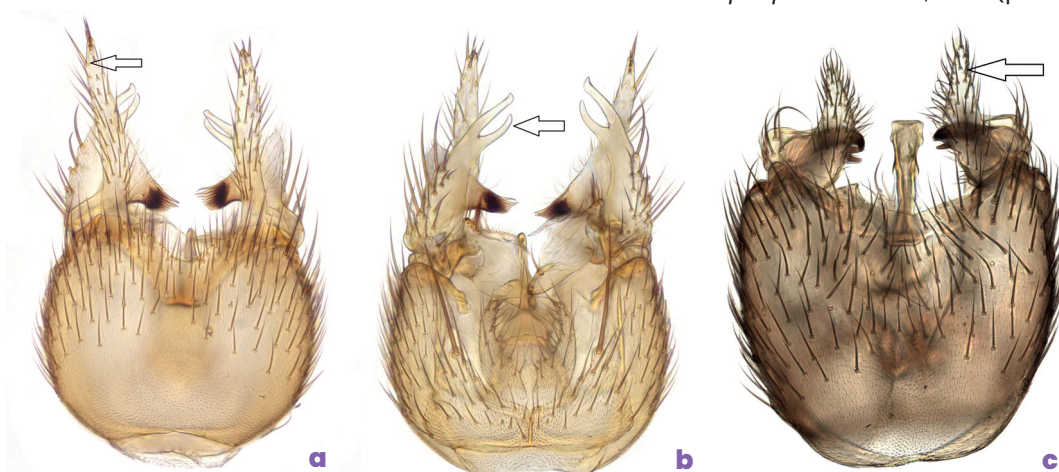


Figure 181. *Rymosia bifida*: (a) ventral and (b) dorsal view of ♂ genitalia.
(c) *Rymosia spinipes* ventral view of ♂ genitalia.

9. Tergites 2-5 (male) (see habitus figure for genus) or 2-6 (female) with complete yellow basal bands. Second proepisternal bristle weak. Crossvein r-m twice or more length of stem of median fork *fasciata* (Meigen, 1804) (p. 213)
- Tergites with yellow markings strongly narrowed or more usually separated medially 10
10. Second proepisternal at least half length of first 11
- Second proepisternal weak or absent 13

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11. Tergites 1-4 (male) or 1-7 (female) entirely yellow laterally with narrow dark median dorsal stripe *coulsoni* Chandler, 1994 (p. 212)
- Tergites 2-5 (male) or 2-7 (sometimes 8) (female) with yellow markings but not entirely yellow laterally 12

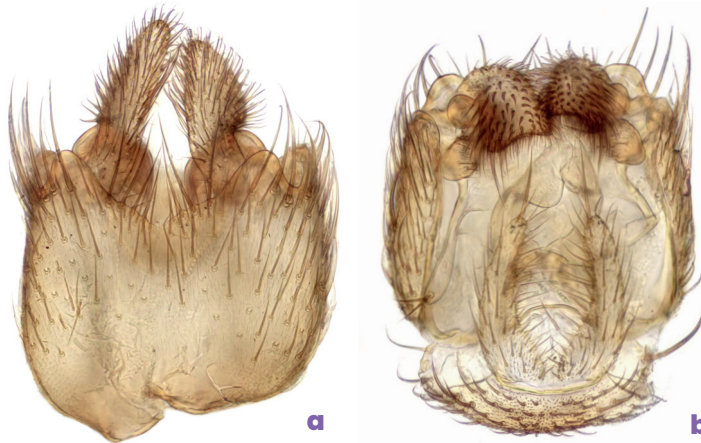


Figure 182. *Rymosia coulsoni*:
(a) ventral and (b) dorsal
view of ♂ genitalia.

12. Tergite 2 (male) entirely yellow laterally, the basal two-thirds of tergites 3-4 and a small yellow basal marking on tergite 5, all broadly separated dorsally; tergites 2-6 (female) with yellow basal markings on basal two-thirds *armata* Lackschewitz, 1937 (p. 211)
- Tergites 2-5 (male) or 2-7 (female) with yellow markings on basal two-thirds or more, widely separated dorsally *thorneae* Chandler, 1994 (p. 214)



Figure 183. Ventral view of ♂
genitalia: (a) *Rymosia armata*;
(b) *Rymosia thorneae*.

13. Tergites with well-defined yellow basal markings, strongly narrowed or narrowly separated dorsally 14
- Tergites with pale markings not well-defined 15

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14. Gonostylus with ventral lobe deeply bilobed apically (arrowed). Tergites 2-5 (male, female not seen) with basal yellow bands, more or less narrowly interrupted dorsally. Only 1 strong proepisternal bristle *fosteri* Chandler, 1994 (p. 213)
- Gonostylus with ventral lobe upturned (arrowed) and rounded apically, not bilobed. Tergites 2-5 (male) or 2-6 (female) with yellow markings occupying half or more of tergites, narrowly interrupted dorsally. A second proepisternal present but rather weak *britteni* Edwards, 1925 (p. 212)

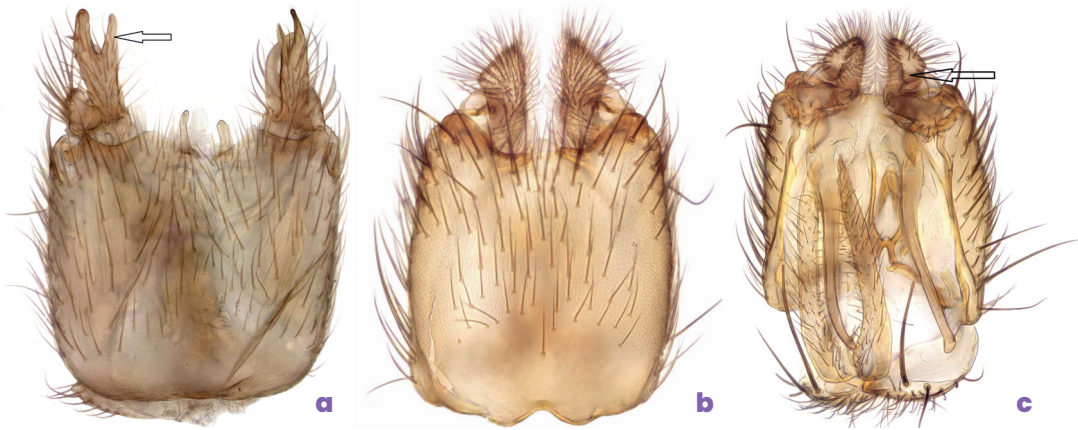


Figure 184. (a) *Rymosia fosteri* ventral view of ♂ genitalia. *Rymosia britteni*: (b) ventral and (c) dorsal view of ♂ genitalia.

15. Gonostylus with narrow ventral lobe and broad medial lobe (arrowed), both bristly; dorsal lobe (arrowed) broad basally and weakly bristled. Tergites 2-4 mainly yellow laterally, tergite 4 narrowly dark apically, the base of tergite 5 sometimes with a yellow patch. Second proepisternal weak, a little less than half length of first *connexa* Winnertz, 1864 (p. 212)

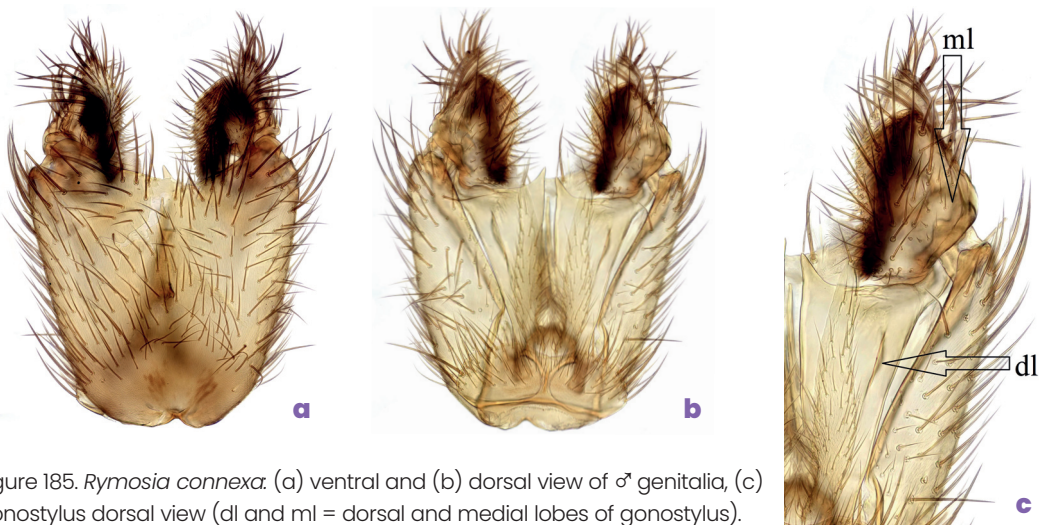


Figure 185. *Rymosia connexa*: (a) ventral and (b) dorsal view of ♂ genitalia, (c) gonostylus dorsal view (dl and ml = dorsal and medial lobes of gonostylus).

- Gonostylus with ventral lobe narrow basally, broadened and curved dorsally at the tip; dorsal lobe slender, with triangular basal flange. Tergites 2-4 (especially tergite 3) with small indistinct yellow basal lateral patches, less than half length of tergite in length and height. Only 1 strong proepisternal bristle *speyae* Chandler, 1994 (p. 214)

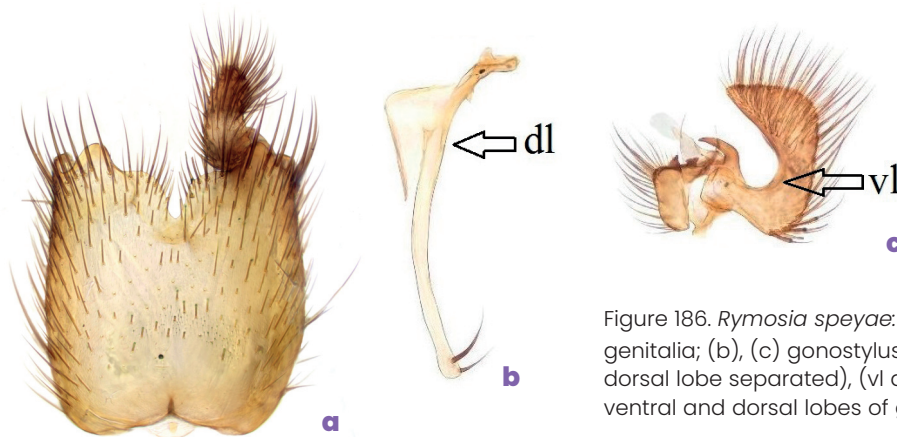


Figure 186. *Rymosia speyae*: (a) ventral ♂ genitalia; (b), (c) gonostylus lateral (with dorsal lobe separated), (vl and dl = ventral and dorsal lobes of gonostylus).

Species notes

Rymosia acta Dziedzicki, 1910

Distribution. Widespread but uncommon in the Scottish Highlands (10 hectads, most records of single individuals – only the male known). Palearctic, widespread in Europe.

Habitat. Broad-leaved or mixed woodland.

Biology. Unknown.

Rymosia affinis Winnertz, 1864

Distribution. Scattered records in S England and Wales are largely from the first half of the 20th century. There were no records from 1951 until 1980, when it was found at two sites in Devon; it was then not found in Britain again until it was recorded at the Warburg Reserve, Bix Bottom, Oxfordshire in 2011 and 2012 (I. Perry). More recently from Piercefield Wood, Gwent in the Wye valley (2018 and 2019, K. Alexander) and South Zeal, Devon (6.x.2019, A. Cunningham). In Ireland two records from the Burren grikes, Co Clare (vi and ix.1991, S.V. Green). Palearctic, widespread in Europe, also in N Africa; often recorded from caves.

Habitat. Broad-leaved woodland.

Biology. In Britain it has been reared from the stipes of terrestrial agarics of the genera *Amanita* and *Russula*. There are continental records from these and other genera of terrestrial agarics. **British records:** *Amanita* sp., *Russula* sp. (Edwards 1925, Madwar 1937).

Other records: *Amanita*, *Cortinarius*, *Entoloma*, *Hygrocybe*, *Hygrophorus*, *Lepiota*, *Macrolepiota*, *Russula*, *Tricholoma* (Dely-Draskovits 1974, Kurina 1991, Kurina 1994).

Rymosia armata Lackschewitz, 1937

Distribution. Most records are from the 1980s Welsh and East Anglian wetland surveys, but there are scattered records across S England and two from N Scotland (Pitmaduthy Moss, E Ross, 1976; Killimster, Caithness, 1990). Widespread in C and N Europe.

Habitat. Wetlands; most sites are bogs or fens, in both open and wooded areas, amongst *Carex rostrata*, *C. paniculata*, *Juncus* flushes and acidic basin mires.

Biology. Unknown.

***Rymosia bifida* Edwards, 1925**

Distribution. Frequent throughout Britain; widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. It develops in terrestrial agarics. **No British records.** **Other records:** *Inocybe geophylla* (Ševčík 2006, Czech Republic), *I. albomarginata* (Ševčík 2010), *I. lacera*, *Homophron spadiceum* (Jakovlev 1994, his own rearings in Karelia). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Rymosia britteni* Edwards, 1925**

Distribution. Most records are from the 1980s Oxfordshire and East Anglian wetland surveys, but there are scattered records across S England (eight hectads are post-2000), two Welsh (Cwm Coedcerrig, Gwent, 1977; Merthyr Tydfil, 2007) and two Scottish records (Fort William, 1921; Bridge of Brown, 1982). Widespread in C and N Europe.

Habitat. Damp woodland, carr, fen and a valley mire on heathland.

Biology. Unknown.

***Rymosia connexa* Winnertz, 1864**

Distribution. A poorly known species with records scattered widely across England and one from S Wales. Most records are from the first half of the 20th century, so there has apparently been a decline without any obvious reason. More recently it has been recorded at Gibraltar Point, Lincs (1968), Wykeham, N Yorks (1978), Great Tiley Wood, Hereford (1998), Whinfell Forest, Cumbria (2005) and Belvoir Park Forest, N Ireland (2019). Palaearctic, widespread in C and N Europe.

Habitat. Some wooded habitats, but also recorded from coastal sites, as well as urban and suburban situations.

Biology. **No British records.** **Other records:** *Tricholoma argyraceum* (Jakovlev 1994, his own rearing in Karelia, as *T. inocybeoides*).

***Rymosia coulsoni* Chandler, 1994**

Distribution. Widespread in N England (5 hectads, 1976–1990) in mostly open upland habitats in the Pennines and North York Moors, but most records are from the 1980s Welsh wetland surveys (28 hectads). The lack of more recent records is attributed to sampling methods and recorder effort in its habitats. Otherwise only recorded from the Czech Republic (Ševčík 2004).

Habitat. Upland valley and basin mires, *Juncus squarrosus* and *Molinia* bogs, *Juncus* flushes and amongst *Sphagnum* and *Eriophorum*.

Biology. Unknown.

***Rymosia fasciata* (Meigen, 1804)**

Distribution. Common throughout Britain and Ireland, also in Isle of Man. Widespread in Europe.

Habitat. Woodland.

Biology. It develops in terrestrial fungi. **British records:** *Clavulinopsis helvola* (slight silky cocoon), *Tricholoma orirubens* (Edwards 1925). **Other records:** *Galerina marginata*, *Morchella esculenta* (Eisfelder 1955). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Rymosia fosteri* Chandler, 1994**

Distribution. A little-known species, first discovered in the 1980s from the Oxfordshire (Lashford Lane Fen) and East Anglian (Catfield, Scarning, Strumpshaw) wetland surveys. It has since been found on a few occasions at scattered sites, at Chippenham Fen (3.xi.2007, I. Perry) and Bedford Purlieus (9.x.2016, Chandler), Cambs, in the Axmouth-Lyme Regis undercliff, Devon (15.x.2011, C.M. Drake), Wychwood Forest (viii-ix.1992, K. Porter) and Warburg Reserve, Bix Bottom (2012, I. Perry), Oxfordshire. Not yet recorded outside Britain.

Habitat. Carr, fen and calcareous valley mires, with some recent records from drier broad-leaved woodland.

Biology. Unknown.

***Rymosia placida* Winnertz, 1864**

Distribution. Frequent but local in occurrence throughout Britain; only one Irish record (Glendalough, Co Wicklow, 1968). Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. No British records. **Other records:** reared from a saproxylic ascomycete *Trichoderma alutaceum* (Ševčík 2010).

***Rymosia setiger* Dziedzicki, 1910**

Distribution. Frequent in the Scottish Highlands (33 hectads), with a few scattered records (most pre-1990) from the Scottish borders (Abbotsford Wood, 1988), N Wales (Coed y Brenin, 1975), Shropshire (Candy Wood, Oswestry, 1935), the Forest of Dean (Glyn Wood, 1989), Cotton Dell, Staffs (2018) and old records from Crowborough, Sussex (1906, 1922). Widespread in Europe.

Habitat. Damp broad-leaved woodland.

Biology. It develops in terrestrial fungi. **No British records. Other records:** *Cortinarius crocolitus*, *Ramaria formosa* (Dely-Draskovits 1974, Hungary), *Hygrophorus erubescens* (Jakovlev 1994, his own rearing in Karelia), *Sarcodon imbricatus* (Kurina 1994 and 1998, Estonia).

***Rymosia signatipes* (van der Wulp, 1859)**

Distribution. Frequent in Wales and in England north to Cumbria (Roudsea Wood NNR, 10.x.1992). Palearctic, widespread in Europe.

Habitat. Damp broad-leaved woodland.

Biology. Unknown.

***Rymosia speyae* Chandler, 1994**

Distribution. Only known in Britain from four localities, three in the central Scottish Highlands (Insh Marshes, 16.vi.1982, W. Ely; Allanaquoich, 30.vi and 23.viii.2000, A. Godfrey; Cairngorms ski-lift area, 2.vii.2008, J. Webb) and one in N Wales (Cors Gyfelog, 26.v.1988, Holmes, Boyce & Reed). Otherwise only recorded from Iceland (Kjærandsen et al. 2007a).

Habitat. Two of its sites (Cors Gyfelog and Insh Marshes) are open floodplain fens. Allanaquoich is an open birch woodland with a high water table in the floodplain of the River Dee.

Biology. Unknown.

***Rymosia spinipes* Winnertz, 1864**

Distribution. Disjunct, widespread in S England north to East Anglia and Lincs, then one record in N Wales (Cwm Einion, 14.x.2007, K. Merrifield) and several scattered (11 hectads) across the Scottish Highlands. There has been a recent increase in records and it is locally frequent. Palearctic, widespread in Europe, also in the Atlantic islands.

Habitat. Occurs in damp broad-leaved woodland.

Biology. It develops in terrestrial fungi, especially *Inocybe* spp, but including several genera of agarics and an unspecific record from Tremellales. **No British records. Other records:** *Entoloma saundersii*, *Inocybe nitidiuscula*, *Tricholoma orirubens* (Ribeiro 1990, Portugal), *Cortinarius* sp., *Inocybe lacera*, *Laccaria laccata* and Tremellales (Jakovlev 1994, his own rearings in Karelia), *Inocybe bongardii* (Kurina 1998), *I. mixtilis* (Ševčík 2010).

***Rymosia thorneae* Chandler, 1994**

Distribution. Five sites are known: Thorne Moor, Yorkshire (viii–x.1990, D. Heaver) and widely separated wetland sites in Wales in 1987–1989 (Plas-y-Gors, Breconshire; Cors Caron and Cors Caranod, Cardiganshire; Cwm Glas Crafnant, Caernarvonshire). Only otherwise recorded from Norway (Kjærandsen and Søli 2020) and Russia (Zaitzev 2003).

Habitat. Wetlands, including bogs, reedbeds and flushes.

Biology. Unknown.

***Rymosia virens* Dziedzicki, 1910**

Distribution. Common throughout most of Britain, especially in Scotland, Wales and SW England; widespread in Ireland. Widespread in Europe.

Habitat. Woodland.

Biology. It develops in terrestrial agarics with most rearing records from *Laccaria* species. **British records:** *Laccaria amethystina* (Trifourkis 1977). **Other records:** *Cortinarius romagnesii* (Ševčík 2006, 2010), *Laccaria amethystina*, *L. laccata* (Ševčík 2010).

Genus *Stigmatomeria* Tuomikoski

Formerly regarded as a subgenus of *Brevicornu*, but rather more robust and with a distinct black patch near tip of each mid and hind coxa. Coloration as for species. Antennae sexually dimorphic, male with all flagellomeres longer than broad, female with flagellomeres thickened and 1-7 shorter than broad. Clypeus large and rounded. Mesonotum with dorsocentral rows of bristles present, although decumbent. Anepisternum with short pale bristles. Two pairs of strong scutellar bristles and 3-4 proepisternal bristles. Wing with base of posterior fork before or sometimes opposite that of the median fork. Fork veins bare. Hind tibia with posterior bristles on no more than apical third. Wing length 3.5-4.5 mm.

Male genitalia with shallow ventral excavation of gonocoxites, enclosing a large hypandrial lobe. Female cercus two-segmented.

This genus was first described as a subgenus of *Brevicornu* and was so treated by Zaitzev (2003). As he stated, Tuomikoski (1966) had initially included two species, while noting that they were doubtfully distinct and they have recently been treated as synonymous, including by Zaitzev (*op. cit.*) and Chandler (2005). However, Kjærandsen *et al.* (2007b) concluded that there were two European species and recognised *S. obscura* (Winnertz, 1864) as distinct from *S. crassicornis* (Stannius, 1831) in the form of the gonostylus (stout in *S. crassicornis* and much more slender in *S. obscura*).



Figure 187. *Stigmatomeria crassicornis* (a) ♂, (b) ♀.

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Species note

Thorax dark brown with yellow humeral area and sides of mesonotum. Abdomen dark brown, tergites 2-4 (male) or 2-6 (female) with yellow lateral markings more or less developed and narrowly including hind margins. Legs yellow apart from black patch on mid and hind coxae *crassicornis* (Stannius, 1831)

Stigmatomeria crassicornis (Stannius, 1831)

Distribution. Common throughout Britain and Ireland, also in Isle of Man. Holarctic, widespread in Europe, also in N Africa.

Habitat. All types of woodland and woodland edge habitats.

Biology. It has been reared from subterranean truffles (? *Tuber* sp.) in Britain (Edwards 1925) and in association with commercial truffle cultivation in North America (Chandler 2010c). However, this is not an obligate relationship, as Jakovlev (2011) reared it from *Ascocoryne sarcoides*. **British records:** ? *Tuber* sp., some specimens in the British Museum labelled "truffles" (Edwards 1925). **Other records:** *Ascocoryne sarcoides* on birch log, larvae in basal parts of conidia and apothecia growing in a crack of decaying wood (Jakovlev 2011).



Figure 188. *Stigmatomeria crassicornis*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) male hypandrial lobe; (d) female head with enlarged flagellum base.

Genus *Synplasta* Skuse

Slender bodied gnats with slender antennae and long legs. Mesonotum dark dorsally, pale laterally; abdomen varying in extent of pale markings, which are when present broadest along hind margins of tergites; legs yellow. Clypeus higher than broad, more or less ovate. Mesonotum with strong bristles only near margins, mostly clothed with pale setulae. One pair of strong scutellars and 2–3 proepisternal bristles. Anepisternum bare. Wing with base of posterior fork well before or sometimes opposite base of stem of the median fork. Fork veins setulose only near tip, on less sclerotised apical portion (posterior fork bare in *S. ingeniosa*); r-m and bm-m bare. False vein weak but extending to about middle of posterior fork. CuP usually strong and reaching beyond level of base of posterior fork (except in *S. ingeniosa* where it is short and weak). Hind coxa with two posterobasal bristles, the upper one shorter. Hind tibia without posterior bristles near tip or 1–2 weak ones present. Hind tibial spurs half or more as long as tarsomere I (shorter in *S. ingeniosa*). Wing length mostly 4.0–4.5 mm, down to 3.0 mm in *S. ingeniosa*.

Male genitalia large with a shallow ventral excavation of the gonocoxites, enclosing a small hypandrial lobe. Tergite 9 with a pair of very long blunt-tipped bristles, cerci simple. Female cercus two-segmented; tergite 7 not much longer than its sternite.

There are 12 or 13 European species, but several species are little known and only 4 are recorded from Britain. Zaitzev (2003) keyed 13 species but based his key in part on the literature as he had only examined 9 species, of which *S. sintenisi* (Lackschewitz, 1937) was placed in synonymy with *S. exclusa* by Ševčík (2009), who described a new species *S. terezae* from Slovakia. The species Zaitzev identified as *S. rufilatera* was *S. praeformida* (Dziedzicki, 1910) (Jan Ševčík *pers. comm.*), the true *S. rufilatera* not having been seen by him. The identity of *S. excogitata* (Dziedzicki, 1910) is also in doubt, but the species formerly recorded from Britain under that name is now accepted as being *S. gracilis*.



Figure 189. *Synplasta exclusa* ♂.

P. CHANDLER

Key to *Synplasta* Skuse

1. Gonostylus with ventral lobe lacking an awl-shaped process and dorsal lobe bifurcate apically. Gonocoxites with hypandrial lobe more than twice as long as broad and slender without lateral projections. Male abdomen with yellow markings on sides of tergites 2-4, broadened on hind margins *ingeniosa* (Kidd, 1969) (p. 219)
- Gonostylus with ventral lobe bearing an awl-shaped process (arrowed for both *gracilis* and *rufilatera*) and dorsal lobe blunt or concave apically with a marginal comb 2
2. Gonocoxites with hypandrial lobe without lateral projections, but apically with two small processes and medially concave between them. Dark abdominal markings more extensive in male, yellow coloration only narrowly reaching fore margins of tergites 2-5 *gracilis* (Winnertz, 1864) (p. 219)
- Gonocoxites with hypandrial lobe bearing broad lateral projections basally. Tergites with at least half of anterior margin yellow in lateral view 3
3. Gonocoxites with hypandrial lobe rounded, and slightly concave medially (arrowed in figure of hypandrial lobe). Tergites 2-5 with basal dark markings extending dorsally more behind so that apical margin only narrowly if at all yellow *rufilatera* (Edwards, 1941) (p. 220)
- Gonocoxites with hypandrial lobe angular apically, with a pointed median protuberance. Tergites 2-5 with basal dark markings only reaching the middle of each tergite, which is mostly yellow (habitus figure) *exclusa* (Dziedzicki, 1910) (p. 219)



Figure 190. Ventral view of ♂ genitalia *Synplasta ingeniosa*.

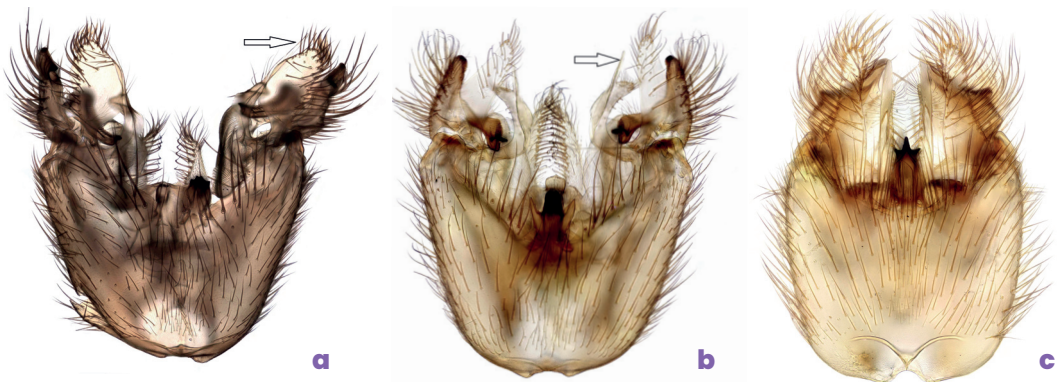


Figure 191. Ventral view of ♂ genitalia of *Synplasta*: (a) *gracilis*; (b) *rufilatera*; (c) *exclusa*.

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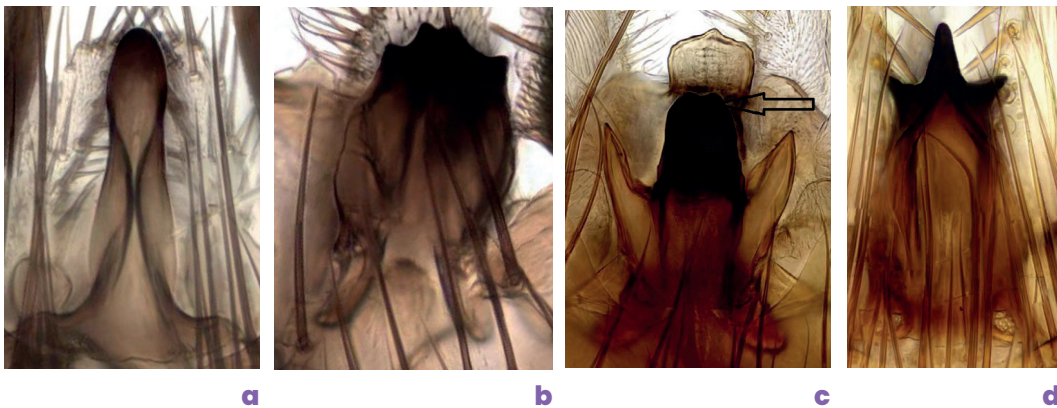


Figure 192. Hypandrial lobes of *Synplasta*: (a) *ingeniosa*; (b) *gracilis*; (c) *rufilatera*; (d) *exclusa*.

Species notes

Synplasta exclusa (Dziedzicki, 1910)

Distribution. First recorded in Britain from S Wales at Cillibion Plantation, Glamorgan (1♂, 21.v.2008, I. Perry) (Chandler and Perry 2011). Since identified from two other sites in S Wales, Clyne Valley (1♀, 6.vii.2009, J. Kramer) and Coed Horseland (1♂, 24.vi.2020, P. Boardman), and from Crickley Hill, Gloucs (5♂, 2♀, vii-ix.2019, K.N.A. Alexander). It is possible that it is a recent arrival in this country. Widespread but scarce in C and N Europe.

Habitat. The Welsh sites are broad-leaved woodland with streams, and with tufa at Coed Horseland. The English site is dry woodland on limestone.

Biology. Unknown.

Synplasta gracilis (Winnertz, 1864)

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man and Jersey. Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. Chandler (1978b) reported that it visited *Coprinus* species, but this and the Russian rearing record mentioned below may relate to one of the genera split from *Coprinus* and now placed in Psathyrellaceae. **British records:** *Mycoacia uda*, *Pleurotus dryinus* (Chandler 1993b). **Other records:** *Coprinus* sp., *Gyromitra esculenta*, *Russula foetens*, *R. paludosa*, *R. sardonia*, *R. vesca*, *Suillus granulatus* (records cited by Jakovlev 1994, all from earlier Russian papers; these records require confirmation because of possible taxonomic confusion).

Synplasta ingeniosa (Kidd, 1969)

Distribution. Widespread but uncommon in England (30 hectads) north to Yorkshire; two Welsh records (Chirk Castle Park, 1996; Cilcenni Dingle, 2006), but only one Scottish record (Den of Alyth, Perthshire, 1975). Widespread in Europe.

Habitat. Broad-leaved woodland.

Biology. Unknown.

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***Synplasta rufilatera* (Edwards, 1941)**

Distribution. Scattered records (11 hectads) across S England from Devon to Norfolk, and N Yorkshire (Marske, 1977). The latest records are from Wychwood (1990, 1992) and the Warburg Reserve (2012), Oxfordshire, Chippenham Fen, Cambs (2006, 2007; previously recorded there in 1920 and 1951) and Midger Wood, Gloucs (2010). Palaearctic, widespread in C and N Europe.

Habitat. Broad-leaved woodland.

Biology. Unknown.

Genus *Tarnania* Tuomikoski

Slender but robust-bodied mainly brownish gnats with slender antennae and long yellow legs. Clypeus ovate. Mesonotum with black bristles in dorsocentral rows. Anepisternum with fine dark bristles. One pair of strong scutellar bristles and 1-2 strong preepisternal bristles. Vein Sc ending in R. Base of posterior fork well before that of the median fork. Fork veins bare. Crossveins r-m and bm-m with setulae above. False vein strong, extending more than half length of posterior fork. CuP strong and reaching beyond level of base of posterior fork. Hind coxa with 2 posterobasal bristles, the upper short, weak setulae in succeeding row. Hind tibia with a dense patch of short posterior bristles near tip (apical quarter), arranged irregularly in approximately three rows (the figure below shows the right hind tibia). Wing length 4.0-5.0 mm.

Male genitalia with a deep ventral excavation, containing a long hypandrial lobe. Female cercus two-segmented.

There are 4 Palaearctic species, all of which occur in Britain. Only 2 species were included by Zaitzev (2003) and the key to this genus is based on that by Kjærandsen (2006).

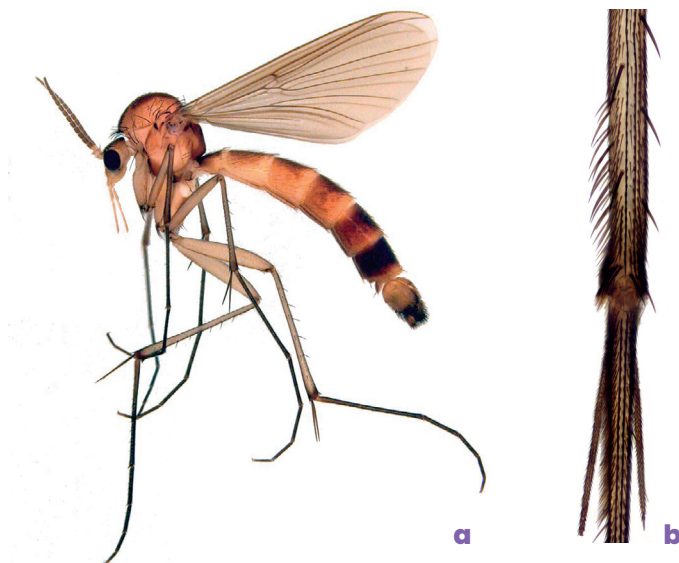


Figure 193. *Tarnania fenestralis*:
(a) ♂; (b) tip of hind tibia.

Key to *Tarnania* Tuomikoski

1. Mesonotum with distinct stripes. Male genitalia as large as or larger than abdominal segment 6 2
- Mesonotum with stripes indistinct or absent. Male genitalia smaller than abdominal segment 6 3
2. Mesonotum with sharply defined dark brown stripes, narrowly surrounded by a pale ground that becomes darker towards the humeral areas. Gonocoxites with hypandrial lobe subquadrate without constriction except at extreme tip (arrowed). Male cercus long and slender and female cercus with second segment slender *dziedzickii* (Edwards, 1941) (p. 222)
- Mesonotum with less sharply defined brown stripes on a uniformly pale yellowish brown ground extending to humeral areas. Gonocoxites with hypandrial lobe broad basally, tapering from base and apical half comprising a narrow apically broadened process with a dorsally directed apical hook (arrowed). Male cercus distinctly broader basally and female cercus with second segment short ovate *fenestralis* (Meigen, 1818) (p. 222)

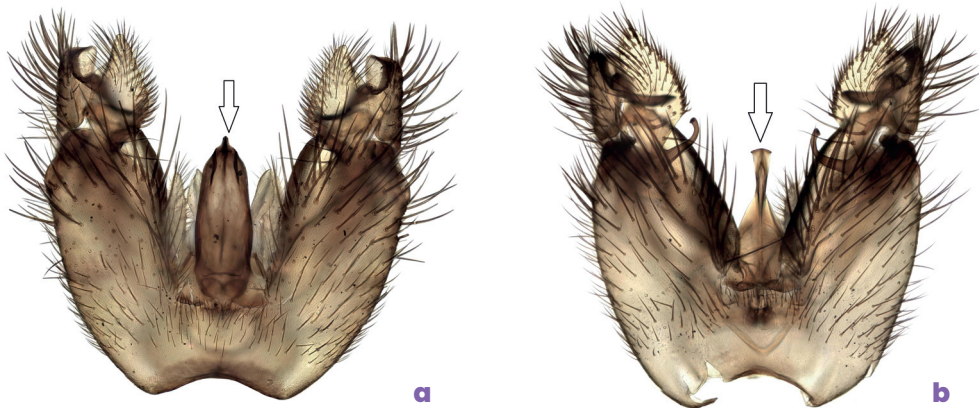


Figure 194. Ventral view of ♂ genitalia: (a) *Tarnania dziedzickii*; (b) *Tarnania fenestralis*.

3. Only one strong proepisternal bristle present. Antenna longer with second flagellomere about 1.3 x as long as broad. Gonocoxites with hypandrial lobe rectangular on basal third, then abruptly constricted into a long narrow process bearing a large dorsally directed apical hook (base of this hook arrowed). Female cercus with second segment 3.5–4 x long as broad *nemoralis* (Edwards, 1941) (p. 223)

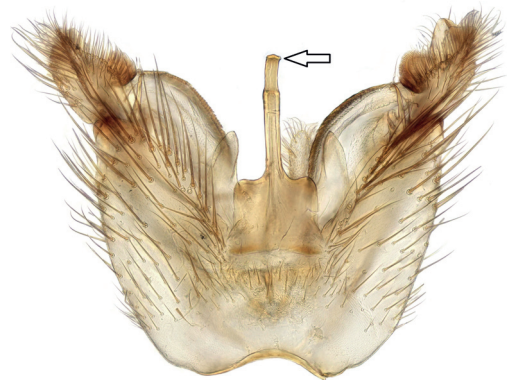


Figure 195. Ventral view of ♂ genitalia
Tarnania nemoralis.

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- One strong and one smaller proepisternal bristle present. Antenna shorter with second flagellomere about as long as broad. Gonocoxites with hypandrial lobe wide and rectangular on basal half to two thirds, then abruptly constricted into a short pointed plate, with a less distinct apical hook (arrowed). Female cercus with second segment 2-3.5 x long as broad *tarnanii* (Dziedzicki, 1910) (p. 223)

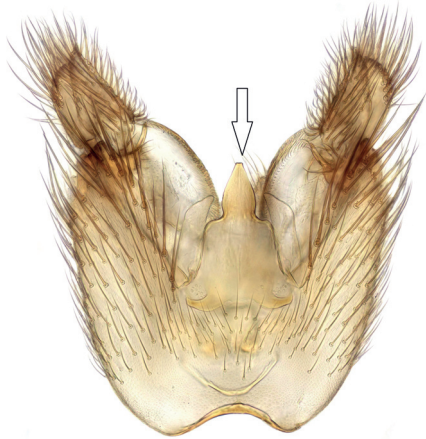


Figure 196. Ventral view of ♂ genitalia
Tarnania tarnanii.

Species notes

Tarnania dziedzickii (Edwards, 1941)

Distribution. Scattered in the west of England (4 hectads), most recently Swineholes Wood, Staffs (1997). Some records are from caves and it may be under-recorded due to lack of recorder effort in such situations. One record from N Wales (Tremeirchan Cave, 1951), two from Scotland (Mar Lodge Estate, 2000; Uath Lochans, 9.ix.2013), and one from Ireland (Glendalough, Co Wicklow, 13.xi.1984). Widespread in Europe, also in N Africa.

Habitat. Broad-leaved woodland; adults are often recorded from caves, in which they aestivate or hibernate.

Biology. No British records. Other records: *Clitocybe*, *Hygrocybe*, *Macrolepiota*, *Omphalotus*, *Russula*, *Tricholoma* (Ribeiro 1990, Portugal).

Tarnania fenestralis (Meigen, 1818)

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man. Widespread in Europe.

Habitat. Woodland.

Biology. It is polyphagous in large terrestrial and saproxylic agarics, and there are also records from a bolete and *Ramaria*. **British records:** *Boletus* sp., *Cortinarius fulgens*, *Entoloma jubatum*, *Pleurotus ostreatus*, *Infundibulicybe gibba*, *Phaeolepiota aurea* (Edwards 1925), *Clitocybe nebularis*, *Infundibulicybe geotropa* (Buxton 1960, A. Cunningham), *Pleurotus dryinus* (Buxton 1960), *Lactarius quietus*, *Melanoleuca grammopodia* (Chandler 1993b), *Clitocybe nebularis*, *Hygrophoropsis aurantiaca* (P. Chandler), *Flammulina velutipes*, *Hebeloma sacchariolens*, *Pholiota aurivella*, *Tricholoma sculpturatum* (J. Webb), *Clitocybe* sp., *Tricholoma argyraceum* (J. Bowden), *Clitocybe nebularis* (R. Fortey; Fortey and Chandler 2021), *Lepista nuda* (A. Cunningham). **Other records:** *Armillaria*, *Clitocybe odora*, *C. rivulosa*, *Cortinarius* sp., *Pleurotus ostreatus*, *Tricholoma*, *Tricholomopsis* (Dely-Draskovits 1974, Eisfelder 1955, Falcoz 1926, Hackman and Meinander 1979, Kurina 1994 and 1998, Rimšaite 2000), *Ramaria formosa* (Dely-Draskovits 1974, Hungary), *Pleurotus eryngii* (M. Nunez pers. comm., unpublished, Spain), *Clitocybe nebularis*, *Cortinarius hinnuleus* (Ševčík 2010).

***Tarnania nemoralis* (Edwards, 1941)**

Distribution. Common throughout Britain. Widespread in Europe.

Habitat. Woodland.

Biology. British records: *Clitocybe phaeophthalma* (R. Fortey; Fortey and Chandler 2021).

***Tarnania tarnanii* (Dziedzicki, 1910)**

Distribution. Widely distributed in the Scottish Highlands (12 hectads: Rannoch, Spey and Findhorn valleys, E and W Ross), also a few pre-1990 sites in England (Wyre Forest, Worcs; Esher Common, Surrey; Hosey Common and Blean Wood, Kent). Palaearctic, widespread in Europe.

Habitat. Woodland; the English records are from wooded fringes of heathland and woods on acid soils, in Scotland found in Caledonian pine forest and in mixed woodland.

Biology. Polyphagous in terrestrial and saproxylic agarics, with most records from *Cortinarius* (10 species) and *Hygrophorus* (6 species). **No British records. Other records:** *Armillaria mellea*, *Rhodocollybia prolixa*, *Cortinarius albobolaceus*, *C. brunneus*, *C. caperatus*, *C. cinnamomeus*, *C. cinnamomeoluteus*, *C. gentilis*, *C. mucosus*, *C. semisanguineus*, *C. triumphans*, *C. violaceus*, *Entoloma sinuatum*, *Hebeloma crustuliniforme*, *H. laterinum*, *Hygrophorus camarophyllus*, *H. eburneus*, *H. erubescens*, *H. olivaceoalbus*, *H. persicolor*, *H. russula*, *Inocybe geophylla*, *I. lacera*, *Lyophyllum* sp., *Melanoleuca melaleuca*, *Russula* sp., *Tricholoma equestre*, *T. virgatum* (Barendrecht 1938, Netherlands; Eisfelder 1955, Germany; Hackman and Meinander 1979, Finland; Kurina 1991, Estonia; Plassmann 1971, Germany; Jakovlev 1994, Karelia; Rimšaite 2000, Lithuania), *Ramaria* sp. (Ševčík 2006, Czech Republic), *Cortinarius brunneus* (Ševčík 2010).

Tribe Mycetophilini

Genus *Dynatosoma* Winnertz

Robust gnats with strong bristly legs, with varying extent of black, brown and yellow coloration and usually with distinct wing markings; legs mainly yellow, but with mid and hind femora often dark apically and mid and hind coxae sometimes dark. Clypeus broader than high. Mesonotum uniformly setulose without dorsocentral bristles. Prothorax bristly, proepisternals not clearly differentiated from other bristling on proepisternum. Anepisternum clothed with bristles. Anepimeron with bristles absent. Four pairs of scutellars. Wing with Sc short and ending in R less than half distance to base of Rs, setulose below. Other veins including fork veins, r-m and bm-m setulose above. CuP long and strongly developed. Mid and hind tibiae with anterior, anterodorsal and dorsal series of long and strong bristles, the longest about 3 times tibial diameter; mid tibia with 2–3 weak ventral bristles. Wing length 3.5–5.5 mm.

Male genitalia with gonostylus including medial lobes, but without any corrugations bearing black spinules (as found in many *Phronia* and *Trichonta* species). Female cercus two-segmented.

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There are 14 European species. Only 5 have been recorded in Britain, all of which are included in the key to 15 species (3 of them only eastern Palaearctic) by Zaitzev (2003), *D. thoracicum* under the name *D. norwegiense* Zaitzev & Økland, 1994 [the nomenclature of the species identified as *D. thoracicum* by Zaitzev requires clarification].

Key to *Dynatosoma* Winnertz

1. Mesonotum yellow or yellowish brown, with at most brownish stripes and abdomen mainly orange. Legs all yellow. Ventral lobe of gonostylus broad and entire, with dense bristles on most of inner side (arrowed) *thoracicum* (Zetterstedt, 1838) (p. 227)
- Mesonotum mainly black or dark brown, sometimes with yellow spots on humeral area and the area above the wing base. Legs with mid and hind femora dark apically. Ventral lobe of gonostylus various 2

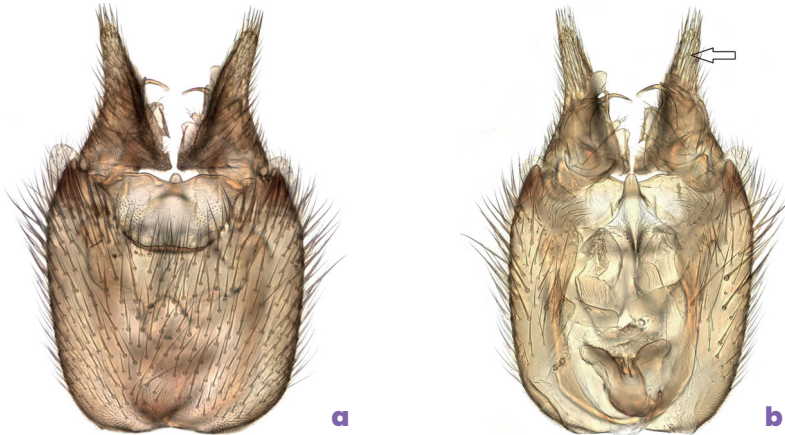


Figure 197. *Dynatosoma thoracicum*: (a) ventral and (b) dorsal (tergite 9 and cerci removed) view of ♂ genitalia.

2. Fore tibia with at least one very strong ventral bristle, almost as long as diameter of tip of tibia. Ventral lobe of gonostylus narrow with long bristles on outer margin (arrowed). A large species (wing 5.0–5.5 mm) with black hind coxae *nigromaculatum* Lundström, 1913 (p. 227)
- Fore tibia with ventral bristles short, less than half diameter of tip of tibia 3



Figure 198. Ventral view of ♂ genitalia of *Dynatosoma nigromaculatum*.

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3. Ventral lobe of gonostylus broad and rounded apically (arrowed). Base of posterior fork at same level as base of median fork. A mainly dark brown species with yellow humeral area and legs yellow except for dark tips to mid and hind femora *cochleare* Strobl, 1895 (p. 226)
- Ventral lobe of gonostylus apically narrow or bifurcate. Base of posterior fork usually beyond base of median fork 4

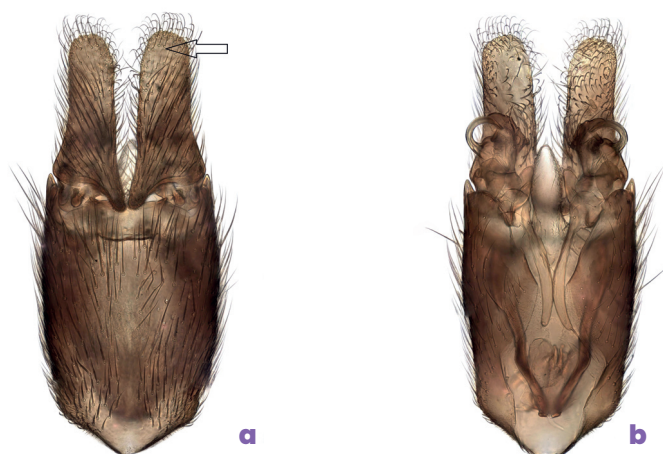


Figure 199. *Dynatosoma cochleare* (a) ventral and (b) dorsal view of ♂ genitalia (tergite 9 and cerci removed).

4. Ventral lobe of gonostylus apically with single narrow process (arrowed) extending from lateral margin. Mesonotum with yellow humeral area. Coxae mainly yellow *fuscicorne* (Meigen, 1818) (p. 226)
- Ventral lobe of gonostylus with two narrow apical processes (both arrowed). Body all black. Mid and hind coxae dark brown *reciprocum* (Walker, 1848) (p. 227)

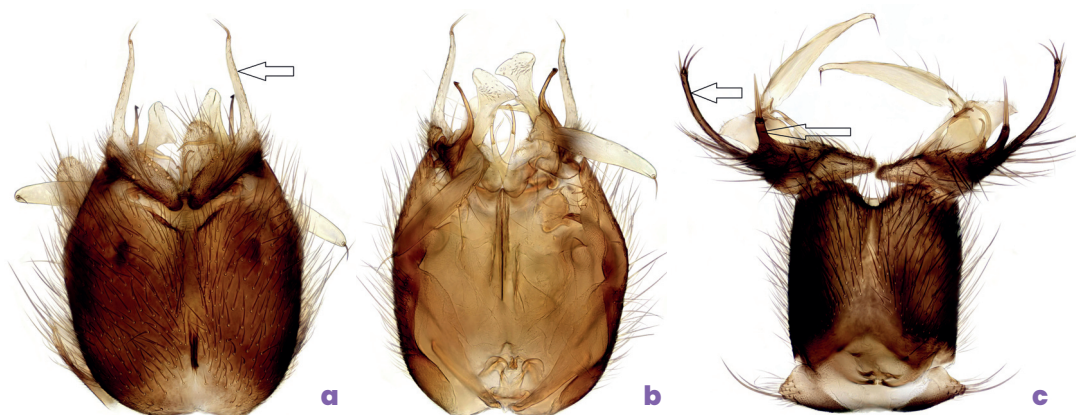


Figure 200. *Dynatosoma fuscicorne*: (a) ventral and (b) dorsal view of ♂ genitalia (tergite 9 and cerci removed). (c) *Dynatosoma reciprocum* ventral view of ♂ genitalia.

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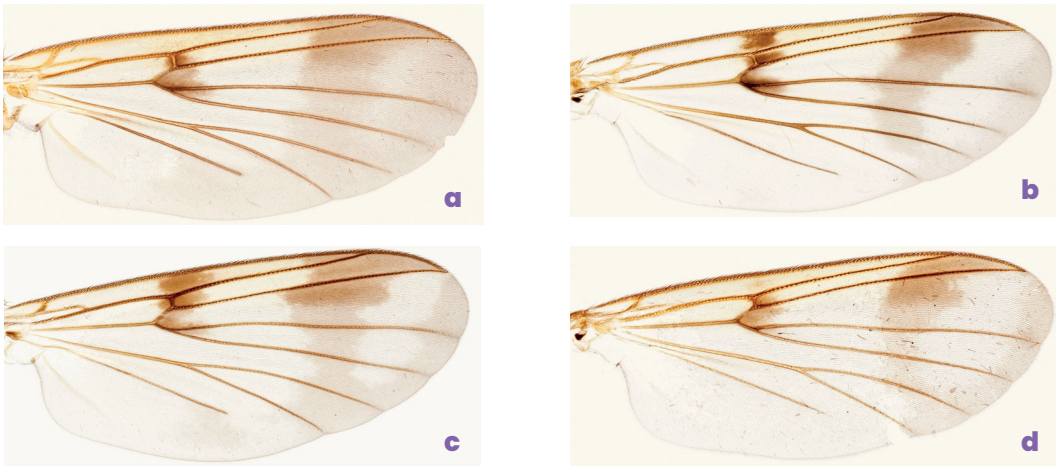


Figure 201. Wing of *Dynatosoma*: (a) *thoracicum*; (b) *nigromaculatum*; (c) *reciprocum*; (d) *fuscicorne*.

Species notes

Dynatosoma cochleare Strobl, 1895

Distribution. Most records are from the Scottish Highlands, where it is widespread but was not recorded between 1937 and 1986, since when it has occurred widely again, suggesting a resurgence at that time (15 hectads but only three post-2000). Since 1990 it has also been found at scattered English sites (9 hectads, 8 with post-2000 records, in Yorks, Lincs, Suffolk, Oxon, Berks, Hants, Sussex, Devon) and in Wales (Merthyr Mawr SSSI, 1999; Trawscoed, 2020), so there appears to have been a recent spread in the south (map, Fig. 7a). Palearctic, widespread in Europe.

Habitat. Broad-leaved and mixed woodland; at Loch an Eilein an adult was found on foliage of an isolated oak.

Biology. Unknown. At Loch Maree it was reared from under pine bark, possibly a pupation site.

Dynatosoma fuscicorne (Meigen, 1818)

Distribution. Common throughout Britain; several records from N Ireland, also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Polyphagous in polypore fungi (developing in many species: records from 13 genera), with large larvae at base of tube layer, and one record from another saproxylic fungus *Phlebia tremellosa*. **British records:** *Bjerkandera adusta*, *Cerioporus squamosus*, *Daedalea quercina*, *Daedaleopsis confragosa*, *Fomitopsis betulina*, *Grifola frondosa*, *Lenzites betulinus*, *Picipes badius*, *Trametes versicolor* (Chandler 1993b, Edwards 1925, Madwar 1937, Trifourkis 1977, J. Webb), *Abortiporus biennis* (Buxton 1960). **Other records:** *Cerioporus leptoccephalus*, *Climacocystis borealis*, *Cyanosporus caesius*, *Fomitopsis betulina*, *F. pinicola*, *Ganoderma applanatum*, *Mensularia radiata*, *Phlebia tremellosa*, *Trametes gibbosa*, *T. hirsuta*, *T. suaveolens*, *T. versicolor* (Dufour 1839; Ševčík 2006, 2010; Jakovlev 1994, 2011).

***Dynatosoma nigromaculatum* Lundström, 1913**

Distribution. Confined in Britain to the Scottish Highlands, where it is widespread, being found in all the principal regions: 20 hectads, 9 with post-2000 records; Flanders Moss (27.vi.2019, R. Wolton) is the most southerly record (map, Fig. 6b). Palaearctic, widespread in Europe.

Habitat. Mainly broad-leaved woodland.

Biology. **British records:** at Dulicht Wood and at Dulsie males were observed alighting on brackets of *Fomes fomentarius* on birch. **Other records:** *Fomes fomentarius* (Zaitzev 1986, Russia), and the saproxylic agaric *Sarcomyxa serotina* (Okada 1939, Japan).

***Dynatosoma reciprocum* (Walker, 1848)**

Distribution. Common throughout Britain; widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. **No British records.** **Other records:** reared from fungal mycelium on decaying wood (Zaitzev 1984, Russia), from *Resinicium bicolor* on decayed sapwood of a spruce trunk and from under bark of a spruce log bearing *Trichaptum abietinum* (Jakovlev 2011, Finland). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Dynatosoma thoracicum* (Zetterstedt, 1838)**

Note. Kjærandsen *et al.* (2007b) applied the name to this species (= *D. norwegiense* Zaitzev & Økland, 1994) following examination of types and concluded that *thoracicum* of Zaitzev (2003) was a different probably undescribed species, which is common in C Europe (Jan Ševčík *pers. comm.*).

Distribution. Only recorded in Britain from a few sites in S England (12 hectads). First recorded in 1989 at Bucklebury Common, Berks and since found again there in 1993 and at other sites in Berks, Bucks, Oxon, Herts, Hants, Dorset and Sussex. Sites additional to those listed by Falk and Chandler (2005) are: East Coppice, Bloxworth, Dorset (2004); Burnham Beeches (2006) and Langley Park (2007), Bucks; Warburg Reserve, Oxon (2015); Foxbury Plantation, Hants (2018); Dallington Forest, Sussex (2018). An orange-bodied female found at Dundreggan in Scotland in 2010 (Chandler 2012) may belong to another related species. Widespread in C and N Europe.

Habitat. British records are restricted to ancient broad-leaved woodland.

Biology. Reared from soft polypores *Postia* and *Tyromyces* spp. **British records:** *Postia tephroleuca* (J. Webb). **Other records:** *Tyromyces chioneus* (Ševčík 2006, 2010, Slovakia). Rearings from the similar fungus *Cyanosporus caesius* in the Czech Republic (Laštovka 1972a as *D. rufithorax*) and Finland (Jakovlev 2011) may refer to an allied species.

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Genus *Epicypta* Winnertz

Small shining black or brownish gnats with unmarked wings and relatively thick yellow legs. Mesonotum with distinct humeral indentation level with prothoracic spiracle, providing a 90 degree or less angle (more sharply than in *Platurocypta*) in side margin of mesonotum. Mesonotum and anepisternum only bearing decumbent setulae. Anepisternum and katepisternum distinctly longer than broad. Laterotergite and anepimeron small and narrow, more horizontal in position than in *Mycetophila* and anepimeron not narrowed below. Pronotal lobes are fused with proepisternum and lack long bristles, only a transverse series of 3–5 strong proepisternals being present below. Two or three pairs of strong scutellars; if a third pair, the basal pair is half length of others. Wing with costa ending at tip of R_{4+5} . Fork veins and r-m setulose, stem of median fork bare; bm-m mainly bare, with (in British species) at most a few setulae apically. Vein M_4 parallel with M_2 throughout and slightly divergent from CuA. Vein CuP ending close to wing margin. Second abdominal segment with a pair of long posteriorly directed bristles on the sternite. Mid and hind tibiae with series of strong anterior and dorsal bristles, mid tibia also with strong ventral bristles, hind tibia with short posterior bristles near tip. Wing length 2.5–3.0 mm.

Male genitalia with large simple cerci; gonocoxites with large medial and ventrolateral bristly lobes and a simple apically rounded median process ventrally; gonostyli small and simple, enclosed within lobes of gonocoxites; aedeagus large, with strongly sclerotised basally fused parameres and a median plate bearing ventrally a pair of strong spines (arrowed in ventral view of *E. limnophila*). Female cercus one-segmented (arrowed in figure of *E. torquata*).

This is one of the largest genera of fungus gnats in all tropical regions, but there are only 7 European species, of which 5 including 3 of the British species are among the 7 species keyed by Zaitzev (2003). The other species in Zaitzev's key either have the hind tibia with 3 rows of strong bristles (anterodorsals also present) or vein bm-m with 4–11 setulae (1–3 at most in the British species). Females of *E. aterrima* and *E. fumigata* cannot yet be separated.

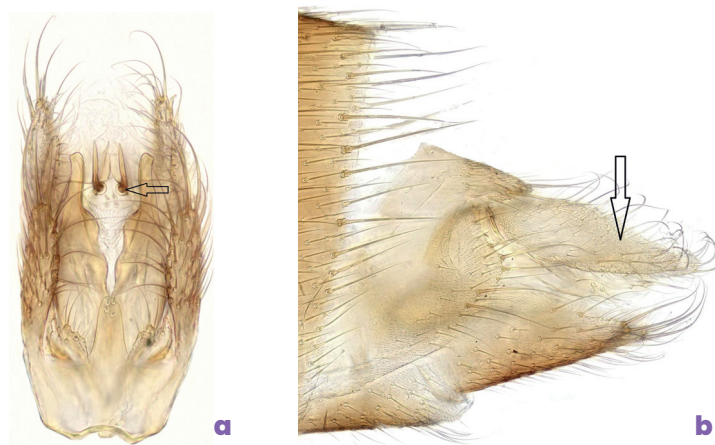


Figure 202. (a) *Epicypta limnophila* male ventral view; (b) *Epicypta torquata* female lateral view.

Key to *Epicypta* Winnertz

1. Abdomen partly yellowish laterally. Stem of median fork as long as r-m (arrowed). Three proepisternals *limnophila* Chandler, 1981 (p. 230)
 - Abdomen entirely black. Stem of median fork often shorter than r-m (arrowed in figure of *E. aterrima*), but variable within species 2
2. Medial lobe of gonocoxites (lower arrow) not longer than cercus (upper arrow) (as in *E. limnophila*). Four proepisternals *aterrima* (Zetterstedt, 1852) (p. 230)
 - Medial lobe of gonocoxites (arrowed in figures of both species) distinctly longer than cercus and ventrolateral lobe of gonocoxites (lower arrow in figure of *E. torquata*) 3

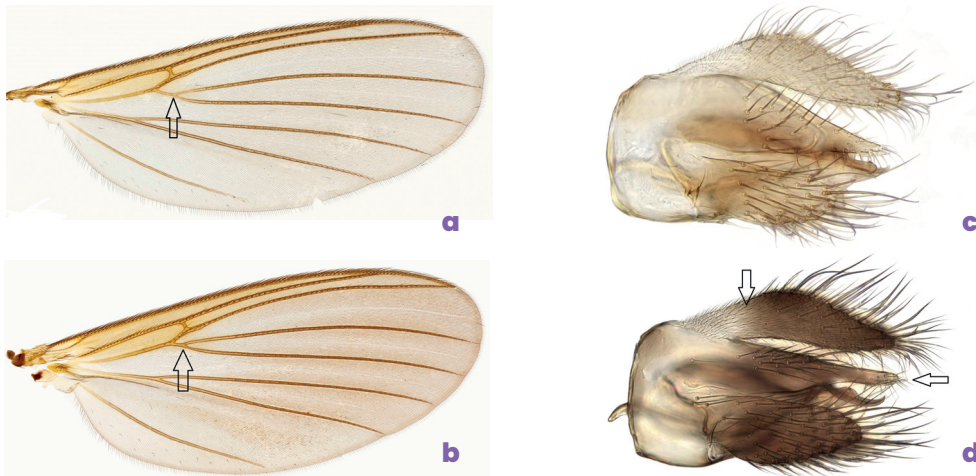


Figure 203. Wing of: (a) *Epicypta limnophila*; (b) *Epicypta aterrima*. Lateral view of ♂ genitalia: (c) *Epicypta limnophila*; (d) *Epicypta aterrima*.

3. Thorax with anterior margin of mesonotum narrowly yellow [some orange on abdomen in type]. Five proepisternals *torquata* Matile, 1977 (p. 230)
 - Body entirely black. Four proepisternals *fumigata* (Dziedzicki, 1923) (p. 230)

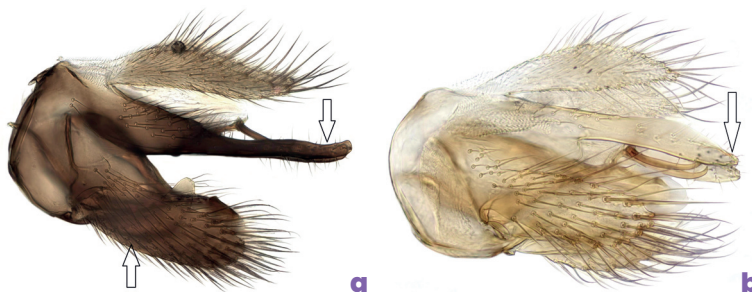


Figure 204. Lateral view of ♂ genitalia: (a) *Epicypta torquata*; (b) *Epicypta fumigata*.

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Species notes

Epicypta aterrima (Zetterstedt, 1852)

Distribution. Frequent throughout Britain; two Irish records (Ballygowan, Co Down, 1975; Clarinbridge, Co Galway, 2000). Holarctic, widespread in Europe.

Habitat. Wet woodland and carr.

Biology. **British records:** larvae bearing cases formed of their excrement live on the surface of rotten wood bearing fungal growth; specific fungal associations have not been reported; they pupate within the case (Edwards 1925). **Other records:** larvae and cocoons on surface of bark (Steenberg 1938).

Epicypta fumigata (Dziedzicki, 1923)

Distribution. This species was new to Britain when recorded by Rob Wolton from Scadsbury Moor, Rutleigh, N Devon in successive years from 2013 to 2015 (Chandler 2014, 2015a, 2016). It has since been recorded in Devon (all R. Wolton) at Halsdon Wood (18.v.2016), Watersmeet, Exmoor (21.iv.2018) and Titcombe Wood, Loddiswell (15.ix.2018). More recently found at Waresley Wood, Cambs (27.v.2019, I. Perry), High Park, Blenheim, Oxon (30.x.2019, Chandler) (Chandler 2020), Crickley Hill, Gloucs (vii-ix.2019, K. Alexander) and Besselsleigh Wood, Berks V.C. (13.ix.2020, R. Mitchell). Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. **No British records.** **Other records:** a decayed hazel log bearing the wood-encrusting fungus *Schizopora* (as *Hyphodontia*: Jakovlev 2011, Finland).

Epicypta limnophila Chandler, 1981

Distribution. Most records are from the 1980s Welsh and East Anglian wetland surveys. There are scattered records from S England and three from Scotland in two hectads (Insh Marshes, 2002; Carrbridge, 2013; Tromie Meadow, 2017). Also one Irish record (Lough Key Forest Park, Co Roscommon, 11.v.1970). Widespread in C and N Europe.

Habitat. A wide range of wetland habitats, including pond margins, fens and reedbeds.

Biology. Unrecorded, but it is considered likely that it also has case-bearing larvae which may live among fen litter.

Epicypta torquata Matile, 1977

Distribution. Known from two Devon sites: Whiddon Deer Park (1.ix.2017, R. Wolton) and Ausewell Wood (viii-ix.2019, K. Alexander), and one area in Somerset (Cloutsham Ball and Eastwater valley at Horner Wood, v-xi.2018, K. Alexander). Widespread in C and S Europe.

Habitat. Woodland.

Biology. Unknown.

Genus *Macrobrachius* Dziedzicki

Closest to the genus *Phronia* Winnertz, with similar wing venation, but distinct in having a very short posterior fork, at most a quarter the length of the median fork, and the costa is strikingly extended almost halfway from R_{4+5} to M_1 , while in *Phronia* it reaches at most a third of the distance between these veins and the posterior fork is longer. Coloration as for species. Clypeus broader than high. Mesonotum and anepisternum bristly. Two pairs of scutellars, 2 proepisternals. Vein Sc ending free. Crossvein r-m and base of median fork subequal or r-m shorter. Fork veins and part of r-m nearest R setulose. Hind coxa without bristles. Mid and hind tibiae with anterior and dorsal series of short bristles. Wing length 2.0–2.5 mm.

Male with tergite 7 well-developed (several times as long as tergite 8), while it is reduced and contracted within tergite 6 in *Phronia* (as in most Mycetophilinae), but genitalia small and simple in structure: gonostylus with a small ventral lobe bearing long bristles (lower arrow) and a larger dorsal lobe bearing short spinose bristles (upper arrow).

The genus includes only a single European species and one in North America.



Figure 205. *Macrobrachius kowarzii*. (a) ♂; (b) head.

Species note

Thorax yellowish on most of the pleura and sides of the mesonotum which is darker brown dorsally, and the scutellum, laterotergite and mediotergite brown. Abdomen dark brown except for yellow lateral patches usually present on tergites 1–4, which are broader basally on 2–4 and reduced to a basal patch on 4. Legs yellow except for the hind femur, which is brown on the apical two fifths. Sometimes with more or less distinct wing markings: an apical shade including the tips of the radial veins and extending to M_1 , an elongate median spot over the base of the median fork, and a longitudinal shade on the stem of the posterior fork *kowarzii* Dziedzicki, 1889

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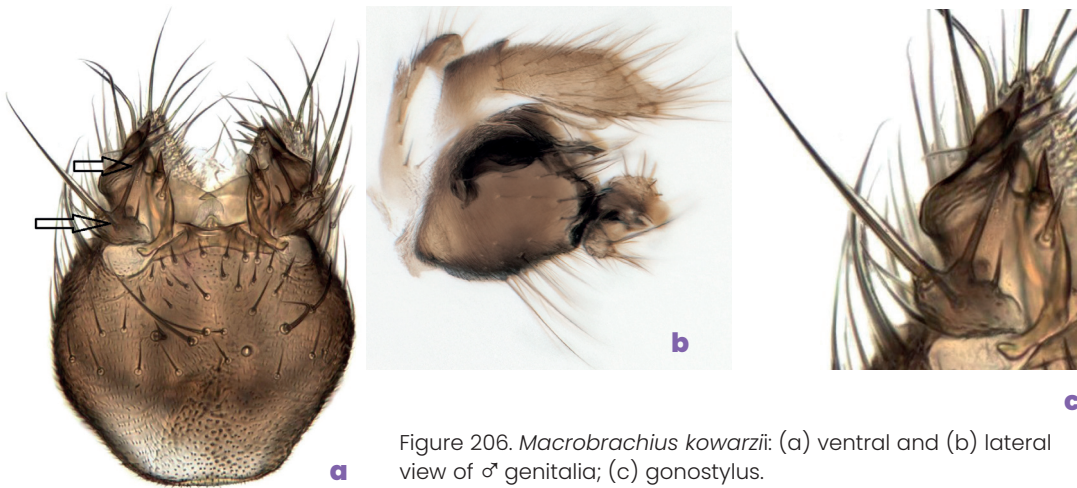


Figure 206. *Macrobrachius kowarzii*: (a) ventral and (b) lateral view of ♂ genitalia; (c) gonostylus.

***Macrobrachius kowarzii* Dziedzicki, 1889**

Note. Dziedzicki (1889), when describing *M. kowarzii*, indicated that both sexes had distinct wing markings as described above, but Chandler (2008b) noted that all the males seen have the wing practically clear, while six Italian females then examined had distinct wing markings, which he figured to show the pattern. Most British males also have the wing unmarked, but the Chippenham Fen specimen has a faint grey marking occupying the base of the median fork.

Distribution. This was first recorded in Britain from Ashenbank Wood, Kent where seven males were obtained in a trapping survey in 2016 (13.ix–2.xi.2016, K. Alexander) (Alexander 2017). It has since been recorded from Windsor Forest, Berks (5 and 19.vii.2018, Chandler) and Dallington Forest, Sussex (29.iv–29.v.2018, J. Simpson) (Chandler and Alexander 2018), and then from Chippenham Fen, Cambs (12.v.2019, I. Perry) (Chandler 2020). Only males have so far been found in Britain. It is possibly a recent arrival. Widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

Genus *Mycetophila* Meigen

Mostly short-bodied more or less robust gnats, with slender antennae and relatively thick bristly legs; coloration of body and wings distinctive in many species. Clypeus broader than high. Mesonotum with shallow humeral indentation, the lateral margin usually gently undulating (distinctly angled in *M. unicolor*, although wider – about 120 degrees – than in *Platurocypta*). Anepisternum not much longer than broad and katepisternum almost quadrate (anepisternum longer in *M. unicolor*, but that has the katepisternum still relatively short because the anepimeron has an undulating lower part to its anterior margin). Anepimeron quite large and vertical with strong bristles present, but strongly narrowed below as in Exechiini. Laterotergite large and projecting. Wing with costa ending at tip of R_{4+5} . Crossvein r-m longer than stem of median fork. Posterior fork present and never much shorter than median fork, its stem bare. Fork veins setulose, r-m also setulose,

bm-m may be setulose or (in most species) bare. Vein M_4 a little divergent from M_2 apically but parallel or slightly convergent with CuA. Hind coxa with setulae variously developed. Mid and hind tibiae with series of strong anterior and dorsal bristles, anterodorsal bristles may also be present; mid tibia usually also with strong ventral bristles. Hind tibial spurs around half or more length of tarsomere 1. Wing length mostly 2.5–5.0 mm, to around 6.5 mm in a few species (e.g. *M. cingulum*, *M. ornata*).

Male genitalia with gonostylus comprising two articulating lobes, the dorsal and ventral stylomeres. Cerci separate. Female cerci usually two-segmented, but single-segmented in the *M. pictula* Meigen Group.

This is a very large genus and the key is simplified by placing most species in more or less artificial groups on external characters. Laffoon (1957) monographed the North American species, and first drew attention to many of the external characters that have proved useful in identification in this genus. Fortunately many species have external characters common to both sexes and females of the majority of species may be determined by these characters and the structure of the ovipositor.

There are at least 128 European species, although several are of doubtful validity. The British fauna includes 77 species, of which 69 are included in the key by Zaitzev (2003), *M. signatoides* under the name *M. assimilis* Matile, 1967; the species included by him under the name *lapponica* is not that species.



Figure 207. (a) *Mycetophila perpallida* ♂; (b) *Mycetophila ornata* ♂.

Key to species groups and some distinctive species of *Mycetophila*

This is a key using external characters that apply to both sexes. Females can be recognised for most species of *Mycetophila* but, within some species groups, reliance has to be placed on the structure of the male genitalia.

1. Ventral bristles absent on mid tibia. Preapical wing markings absent, at most a central spot present or entirely unmarked (as in *M. perpallida*). Mesonotum dull brownish, more or less grey dusted, with more or less fused darker stripes. Mid and hind tibiae lack anterodorsal bristles. Hind tibia with well-developed series of posterior bristles on apical third to two thirds. Female fore tarsi simple and cercus two-segmented GROUP 1 (p. 243)
- One to three ventral bristles present on mid tibia (as in figures of *M. ornata* and *M. signatoides*) 2

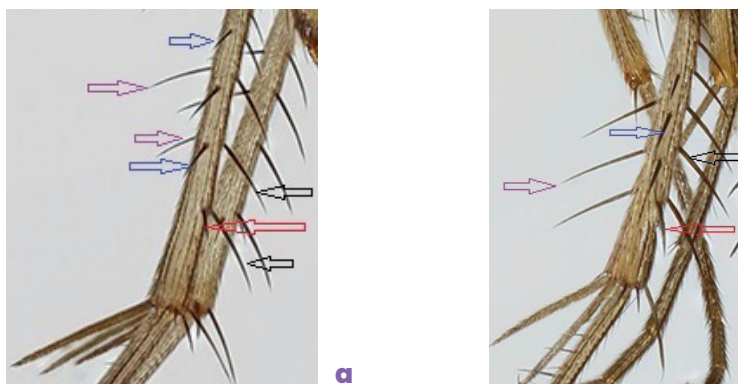


Figure 208. Anterior view of mid tibia: (a) *Mycetophila ornata*; (b) *M. signatoides*. Arrows: purple = ventral; blue = anterior; red = anterodorsal; black = dorsal bristles.

2. Wing with a broad shade on apical part including the tips of veins R_1 and R_{4+5} , this shade fading but not narrowed behind (as in *M. sordida*). Anterior setulae on mid and hind tibiae all dark. Female fore tarsi simple, cercus two-segmented GROUP 2 (p. 247)
- Preapical wing marking, if present and including tips of both veins R_1 and R_{4+5} , distinctly narrowed behind vein R_{4+5} (as arrowed for *M. magnicauda*) 3

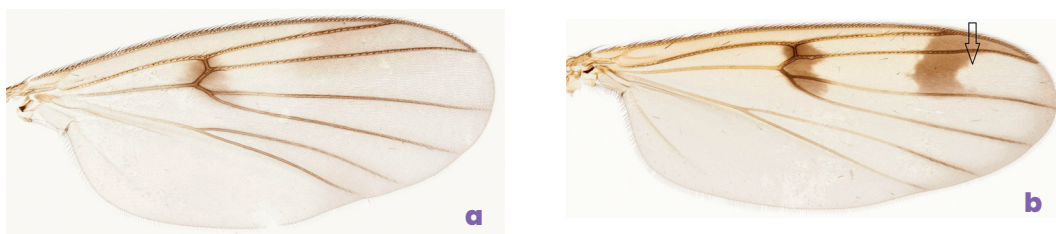


Figure 209. Wing of: (a) *Mycetophila sordida*; (b) *Mycetophila magnicauda*.

3. Preapical wing marking including tip of vein R_1 but not R_{4+5} , leaving tip of cell r_1 clear (as in *M. caudata* and *M. formosa*). Vein $bm-m$ bare. Mid and hind tibiae without anterodorsal bristles. Female fore tarsi simple, cercus two-segmented 4
- Preapical wing marking, if distinct and reaching costa, including tip of cell r_1 (as in *M. magnicauda*) 5

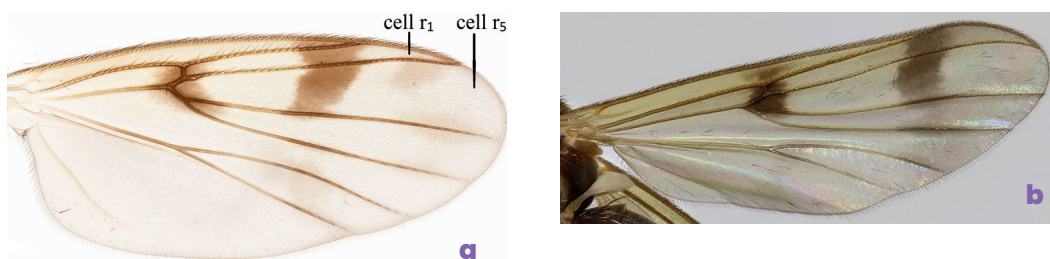


Figure 210. Wing of: (a) *Mycetophila caudata*; (b) *Mycetophila formosa*.

4. Hind femur narrowly dark dorsally. Mesonotum shining black with large yellow humeral areas. Central wing spot only behind R . Mid tibia with 3 ventral bristles. Anterior setulae on mid and hind tibiae yellow. Male genitalia large, extended forwards ventrally below segments 5 and 6. Female with long bristles on margin of tergite 6 (arrowed, p. 236) *caudata* Staeger, 1840 (p. 282)
- Hind femur narrowly dark at tip only. Mesonotum dull yellow with brown stripes. Central wing spot usually extended to costa (sometimes only behind R). Mid tibia with only 1 ventral bristle. Anterior setulae on mid and hind tibiae all dark. Male genitalia small, not longer than tergite 6 (p. 236). Female without long bristles on tergite 6 *formosa* Lundström, 1911 (p. 285)

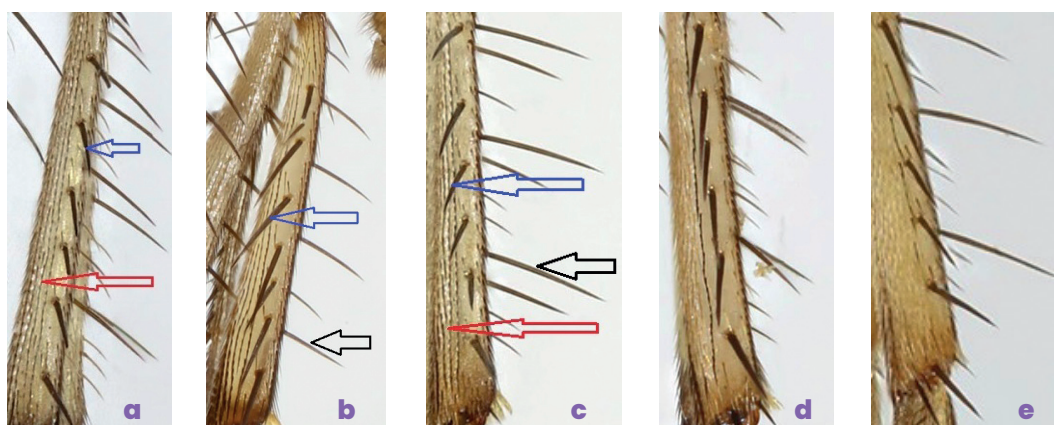


Figure 211. Anterior face of hind tibia of *Mycetophila*: (a) *ocellus*; (b) *curviseta*; (c) *fraterna*; (d) *rudis*; (e) *signatoides*. Hind tibia showing rows of setulae: all dark in *ocellus*; two or more rows in front of anterior bristles partly dark, especially on apical half in *curviseta* and *fraterna*; mainly yellow, with only row nearest anterior bristles mainly dark in *rudis* and partly dark in *signatoides*.

Arrows: black = dorsal and blue = anterior bristles; red = rows of setulae.

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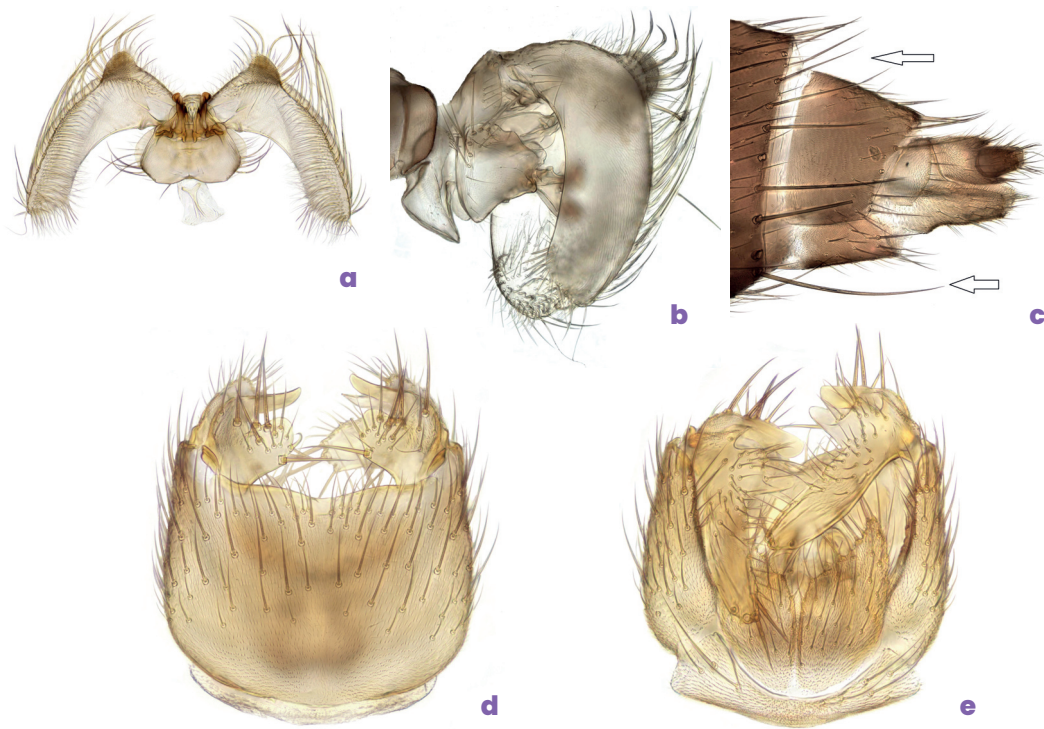


Figure 212. *Mycetophila caudata*: (a) ventral and (b) lateral view of ♂ genitalia; (c) female. *Mycetophila formosa*: (d) ventral and (e) dorsal views of ♂ genitalia.

5. Hind femur dark along entire length dorsally (as shown for *M. vittipes*). Preapical wing marking includes tip of R_1 but strongly narrowed behind R_{4+5} (as shown above for *M. magnicauda*). Mid and hind tibiae without anterodorsal bristles. Anterior setulae on mid and hind tibiae all dark. Hind tibia with only long dorsal bristles. Female fore tarsi simple, cercus two-segmented 6

- Hind femur darkened on less than apical half dorsally 7



Figure 213. *Mycetophila vittipes* dark edge of hind femur.

6. Vein $bm-m$ without setulae (arrowed). Thorax dull yellow, with three dark stripes. Male genitalia large and yellow, longer than tergites 4-5 together. Male abdomen brown, sometimes tergites 1-3 yellow laterally. Female abdomen mainly yellow with interrupted brown bands on tergites 1-5, tergite 6 all yellow *magnicauda* Strobl, 1895 (p. 289)

- Vein $bm-m$ setulose. Male genitalia small, contracted into tergite 7 GROUP 3 (p. 251)

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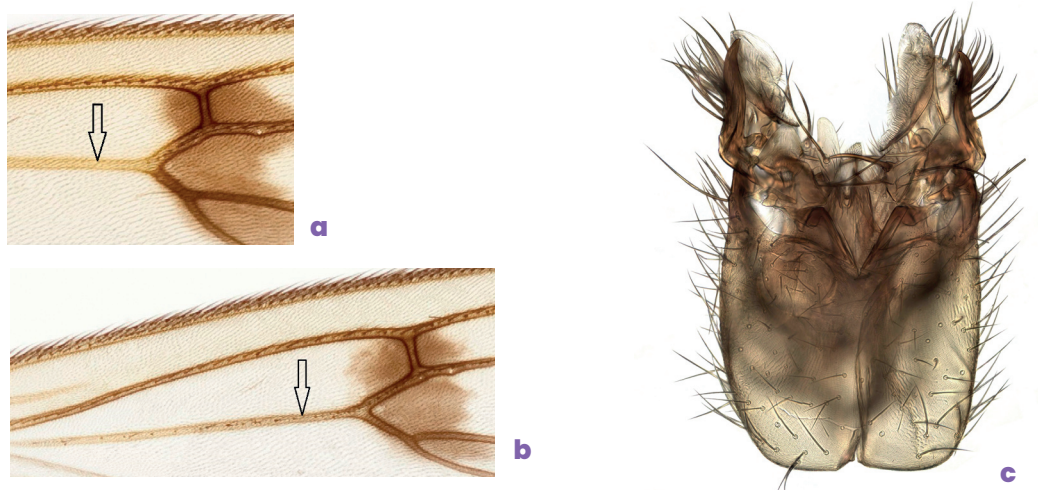


Figure 214. Wing, arrows indicate bm-m, of: (a) *Mycetophila magnicauda*; (b) *Mycetophila vittipes* (GROUP 3). (c) *Mycetophila magnicauda*, ventral view of ♂ genitalia.

7. Preapical wing marking including or beginning close to tip of R_1 (as in *M. pictula*), sometimes narrowly distal to it. Hind tibia without anterodorsal bristles. Anterior setulae on mid and hind tibiae all dark GROUP 4 (p. 254)
- Preapical wing marking distinctly distal to tip of R_1 (as in *M. strigata*) (species in which this character is variable are keyed in both sections), or absent 8



Figure 215. Wing of: (a) *Mycetophila pictula* (GROUP 4); (b) *Mycetophila strigata* (GROUP 5).

8. Vein bm-m setulose on greater part below. Hind tibia without anterodorsal bristles, but with short dorsal bristles interspersed with the usual long dorsal bristles GROUP 5 (p. 260)
- Vein bm-m with no more than 1-3 setulae near tip below (up to 12 but only on apical part in *M. eppingensis*, which only has long dorsal bristles on hind tibia) 9
9. Mid tibia without an anterodorsal bristle 10
- Mid tibia with at least one anterodorsal bristle, situated near apical third as indicated in figures of *M. ornata* and *M. signatoides* (Fig. 208) 11

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10. Wing unmarked. Body black except for small yellowish humeral areas and yellow genitalia. Mid tibia with one ventral bristle. Hind femur narrowly dark at tip. Hind tibia with only strong dorsal bristles *hyrcania* Laštovka & Matile, 1969 (p. 287)

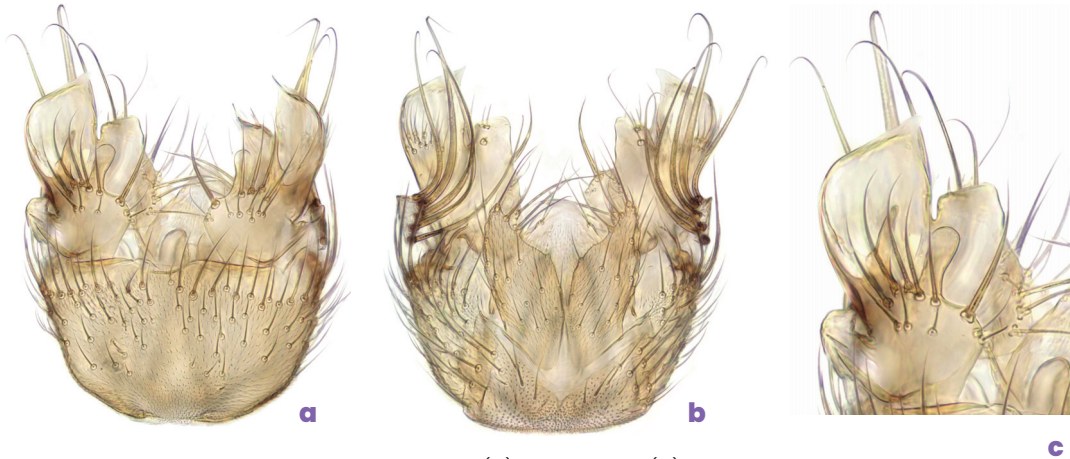


Figure 216. *Mycetophila hyrcania*: (a) ventral and (b) dorsal views ♂ genitalia; (c) gonostylus ventral view.

- Wing with median and preapical markings. Mesonotum yellow laterally, with fused dark stripes dorsally *abbreviata* Landrock, 1914 (p. 280) [also see GROUP 4]



Figure 217. Wing of *Mycetophila abbreviata*.

11. Mid and hind tibiae with one or more anterodorsal bristles (red arrows in figure of *M. cingulum*). Wing with distinct preapical band (except in *M. immaculata*) GROUP 6 (p. 264)

- Hind tibia without anterodorsal bristles, but mid tibia always with one short anterodorsal bristle situated at about two thirds from base beyond anterior bristles 12



Figure 218. Wing of *Mycetophila occultans*.

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12. Hind tibia with only strong dorsal bristles (as shown for *M. luctuosa*). Hind tibia with most anterior setulae yellow, only the row nearest to the anterior bristles always mainly brown. Mid tibia with first two rows of anterior setulae dark GROUP 7 (p. 266)
- Hind tibia with short bristles interspersed with the strong dorsal bristles (as in *M. rudis*) 13
13. Hind tibia with at most first row of anterior setulae in front of anterior bristles partly or entirely brown, other rows all yellow. Mesonotum strongly shining. Preapical wing marking distinct. Hind femur narrowly dark apically GROUP 8 (p. 269)
- Hind tibia with at least first two rows of anterior setulae in front of anterior bristles partly or entirely brown, other rows partly dark at least near tip. Mesonotum dull to slightly shining. (If anterior setulae light brown as in *M. lamellata*, thorax dull and preapical wing marking faint) 14

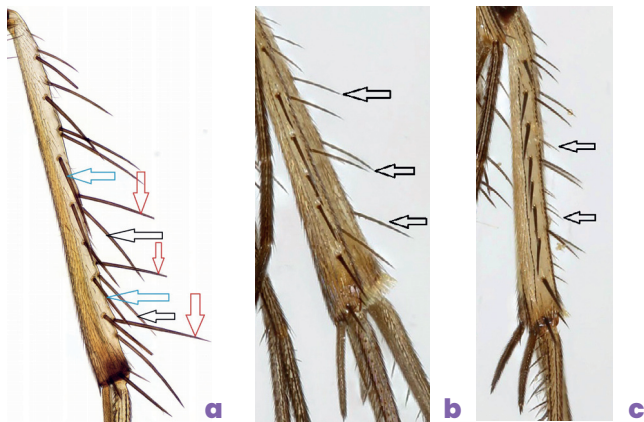


Figure 219. Anterior view of hind tibia of *Mycetophila*: (a) *cingulum* (GROUP 6); (b) *luctuosa* (GROUP 7); (c) *rudis* (GROUP 8). (a)(b) with only strong dorsal bristles, (c) with short bristles interspersed (blue = anterior, red = anterodorsal, black = dorsal bristles).

14. Preapical wing marking faint or absent. Anterior setulae on hind tibia all dark. Second flagellomere more than 1.5 x as long as broad. Female fore tarsi thickened 15
- Preapical wing marking distinct 17



Figure 220. Wing of: (a) *Mycetophila pumila*; (b) *Mycetophila lamellata*.

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15. Body entirely slightly shining black, grey dusted, only genitalia (in both sexes) yellow. Wing with central spot only or with a faint preapical shade reaching the middle of cell r_5 (Fig. 218). Hind femur dark on apical third to two fifths. Gonocoxites produced medially, with long bristles near apical margin. Female fore tarsi with tarsomeres 2–4 thickened *occultans* Lundström, 1913 (p. 290)
- Mesonotum partly yellow. Wing with faint preapical shade or patch 16

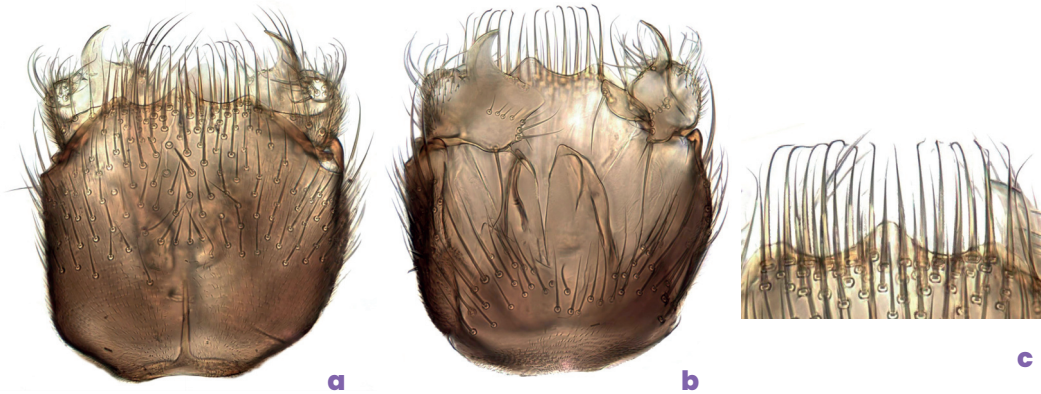


Figure 221. *Mycetophila occultans* ♂ genitalia: (a) ventral and (b) dorsal views; (c) ventral apex

16. Mesonotum faintly shining black with yellow humeral areas and fore margin. Abdomen black in both sexes. Hind femur dark on apical quarter to third. Female fore tarsi a little thickened below tarsomeres 2–3 *pumila* Winnertz, 1864 (p. 292)

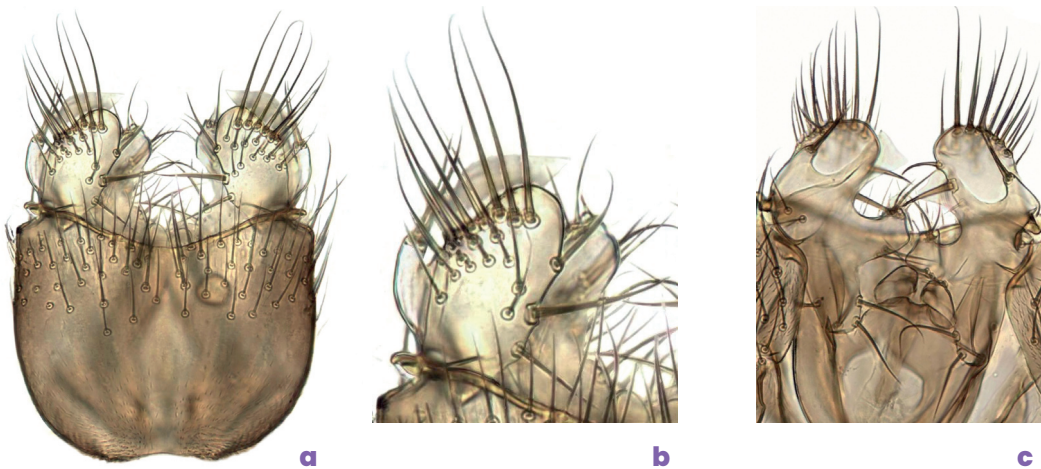


Figure 222. *Mycetophila pumila*: (a) ventral view of ♂ genitalia; (b) ventral and (c) dorsal views of gonostylus.

- Mesonotum dull, broadly yellow at sides, with three more or less fused dark stripes dorsally. Hind femur dark on apical quarter or less. Abdomen black in male with genitalia brownish, in female largely yellow at sides and hind margins of tergites 2-5, and tergite 6 all yellow. Female fore tarsi with tarsomeres 2-4 thickened *lamellata* Lundström, 1911 (p. 288)

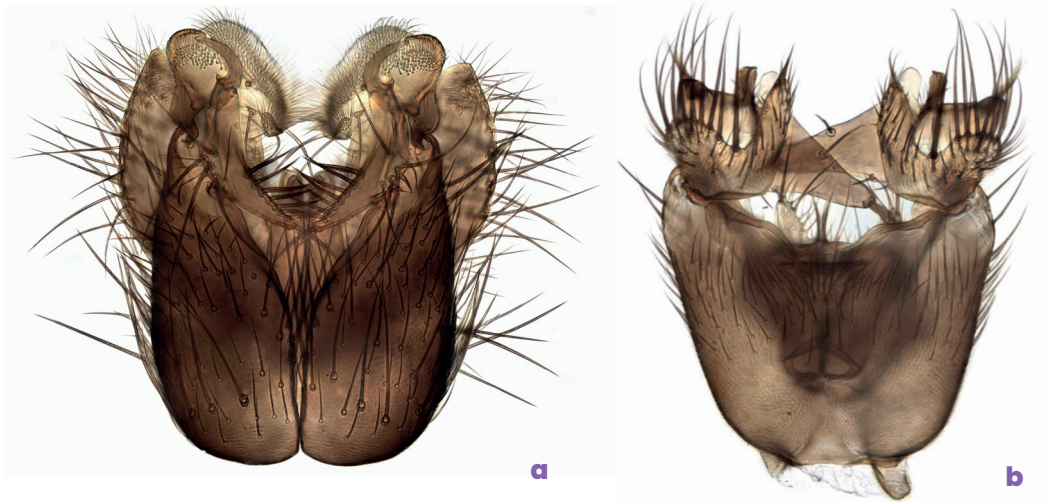


Figure 223. Ventral views of ♂ genitalia: (a) *Mycetophila lamellata*; (b) *Mycetophila ornata*.

17. Hind femur entirely yellow, only appearing darker at extreme tip. Mesonotum brownish yellow with three more or less distinct darker stripes dorsally. A large species (wing 4.0-6.5 mm, usually over 5 mm) with a sinuous preapical wing band across both forks, usually broken at least in cell r_5 (occasionally more continuous or reduced to a series of spots). Hind tibia with 7-14 short posterior bristles on apical half. Anterior setulae of mid and hind tibiae all dark. Female fore tarsi simple *ornata* Stephens, 1846 (p. 291)
- Hind femur at least narrowly dark apically. Smaller species, wing length up to 4.5 mm. If preapical wing band extends across cell r_5 it is not broken. Hind tibia with 6 or less posterior bristles on apical part18

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18. Hind tibia with more than half of first two rows of anterior setulae (those nearest to the anterior bristles) dark brown but basal half or more of succeeding rows paler. Preapical wing marking usually a sinuous band starting on costa well beyond tip of R_1 , usually extending across median fork and strongly developed at least close to M_1 (weakly developed in *M. hetschkoi*) GROUP 9 (p. 274)
- Hind tibia with all anterior setulae dark. Preapical wing marking broad and compact, not distinctly extending beyond middle of cell r_5 . Second flagellomere more than 1.5 x as long as broad 19



Figure 224. Wing of *Mycetophila*: (a) *ornata*, (b) *lubomirskii*; (c) *lunata* (GROUP 9); (d) *hetschkoi* (GROUP 9).

19. Ventral lobe of gonostylus bilobed and with a strong medially directed spine (arrowed) on outer branch. Mesonotum slightly shining with dark brown fused stripes dorsally, yellow at sides and on humeral area. Female fore tarsi simple; cercus two-segmented *lubomirskii* Dziedzicki, 1884 (p. 288) [also see GROUP 4]
- Ventral lobe of gonostylus without strong spines. Mesonotum dull 20



Figure 225. *Mycetophila lubomirskii* gonostyli.

20. Genitalia small, yellow, not broader than tergites. Mesonotum dull black with broad yellow humeral areas, each occupying a third of its width and a narrow yellow fore margin. Female fore tarsi with tarsomeres 2-3 thickened *v-nigrum* Lundström, 1913 (p. 298)
- Genitalia brown, broader than tergites. Mesonotum dull yellow with three brown stripes dorsally. Male abdomen brown, tergites 2-3 yellow at side margins or 2-4 yellow basally. [Female not examined, abdomen yellow according to Zaitzev 2003] *mohilevensis* Dziedzicki, 1884 (p. 290)

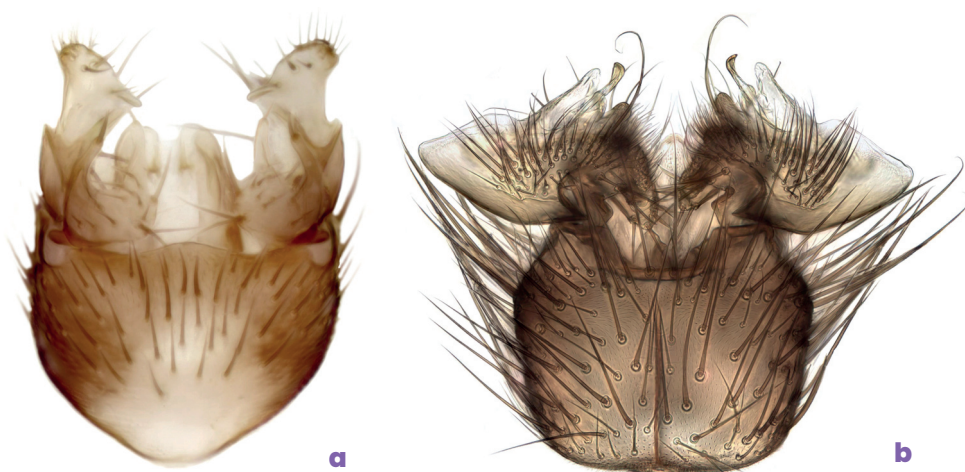


Figure 226. Ventral views of ♂ genitalia: (a) *Mycetophila v-nigrum*; (b) *Mycetophila mohilevensis*.

KEY TO GROUP 1 [*fungorum* and *ruficollis* Groups]

1. Vein bm-m bare below. Wing unmarked, yellow tinted [*fungorum* Group] 2
- Vein bm-m setulose for greater part below. Wing with a more or less distinct spot over crossvein r-m [*ruficollis* Group] 3



Figure 227. Wing of: (a) *Mycetophila fungorum*; (b) *Mycetophila ruficollis*.

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2. Ventral lobe of gonostylus bearing two strong spinose bristles (arrowed) in middle of apical edge; distal process of base of dorsal lobe bilobed (arrowed) *fungorum* (De Geer, 1776) (p. 286)
- Ventral lobe of gonostylus with close-set spinose bristles (arrowed) near internal part of apical edge; distal process of base of dorsal lobe not bilobed (arrowed) *perpallida* Chandler, 1993 (p. 291)

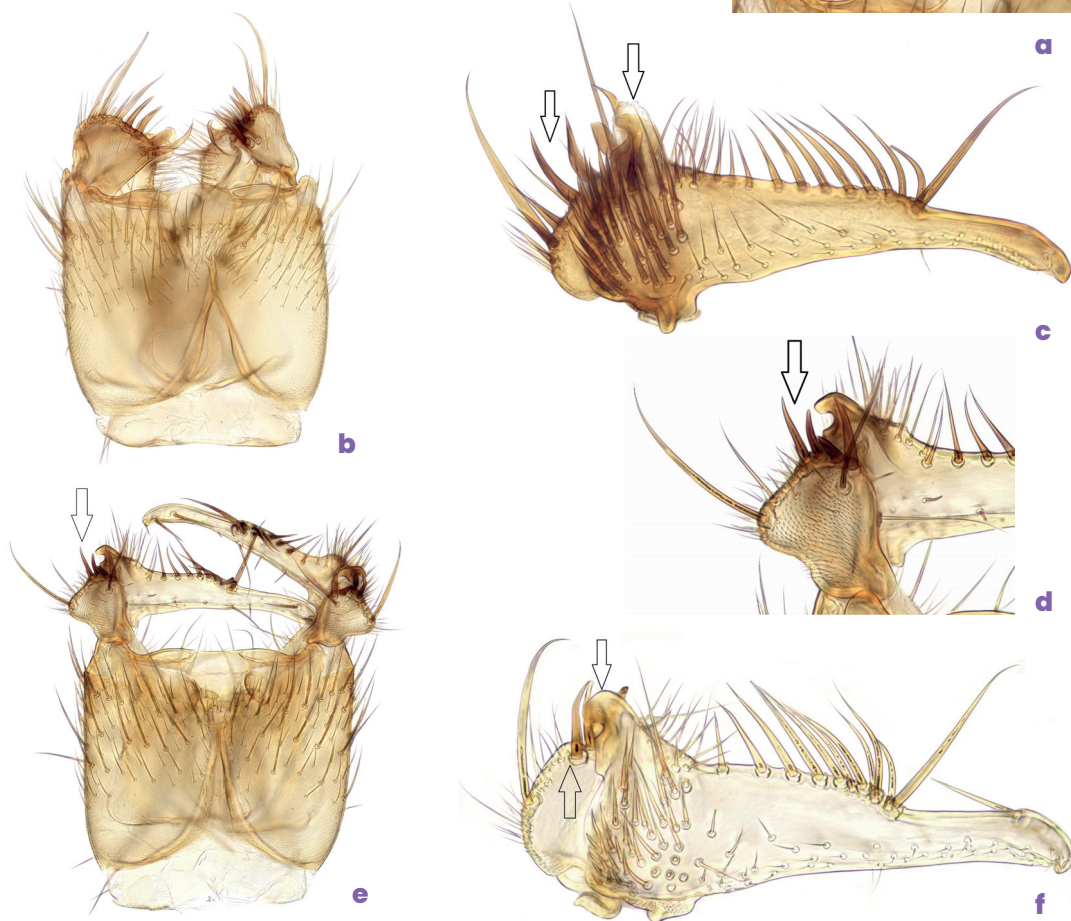
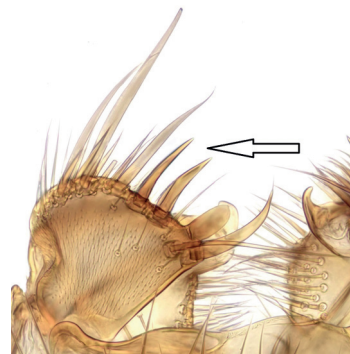


Figure 228. *Mycetophila fungorum*: (a) Ventral lobe of gonostylus; (b) ventral view of σ genitalia; (c) outer face of dorsal lobe of gonostylus. *Mycetophila perpallida*: (d) Ventral lobe of gonostylus; (e) ventral view of σ genitalia; (f) outer face of dorsal lobe of gonostylus.

3. Dorsal lobe of gonostylus with sharply narrowed apical part (arrowed). Female with first segment of cercus not distinctly longer than basally widened second segment. Third palpomere as wide (female) or wider than (male) second palpomere and as long (male) or slightly shorter than (female) fourth palpomere *ruficollis* Meigen, 1818 (p. 292)

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- Dorsal lobe of gonostylus with apical part not sharply narrowed. Female with first segment of cercus distinctly longer than second segment or second segment not basally widened. Third palpomere narrower than second and distinctly shorter than fourth in both sexes 4

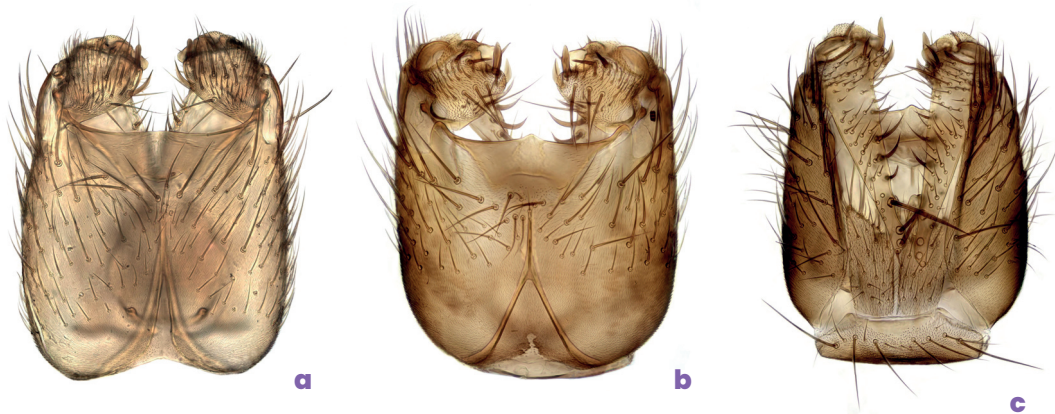


Figure 229. *Mycetophila ruficollis*: (a) ventral view of ♂ genitalia. *Mycetophila ichneumonea*: (b) ventral; (c) dorsal of ♂ genitalia.

4. Central wing spot small or indistinct. Second flagellomere at most only slightly shorter than third. Posterior process of ventral lobe of gonostylus narrow and smooth. Second segment of female cercus not distinctly shorter than first nor wider basally *sepulta* (Laffoon, 1956) (p. 293)
- Central wing spot distinct. Second flagellomere distinctly shorter than third. Posterior process of ventral lobe of gonostylus wider and bearing warts or setulae. Second segment of female cercus distinctly longer than first or widened in basal half 5



Figure 230. Wings of: (a)(b) *Mycetophila sepulta* showing variation in central spot; (c) *ichneumonea*; (d) *britannica*.

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5. Antenna rather short and thick, with second flagellomere quadrate or nearly so and first flagellomere less than twice as long as broad. Third palpomere club-shaped, only a little wider than fourth 6
 - Antenna longer and more slender, with second flagellomere distinctly longer than broad and first flagellomere about twice as long as broad. Third palpomere more ovate and distinctly wider than fourth 7
6. Dorsal lobe of gonostylus with lateral margin deeply notched (arrowed). Female with first segment of cercus slightly notched apically, its ventral lobe not reaching the middle of second segment *ichneumonea* Say, 1823 (p. 287)
 - Dorsal lobe of gonostylus with lateral margin only slightly notched. Female with first segment of cercus greatly notched apically, its ventral lobe at least reaching the middle of second segment *uninotata* Zetterstedt, 1852 (p. 297)

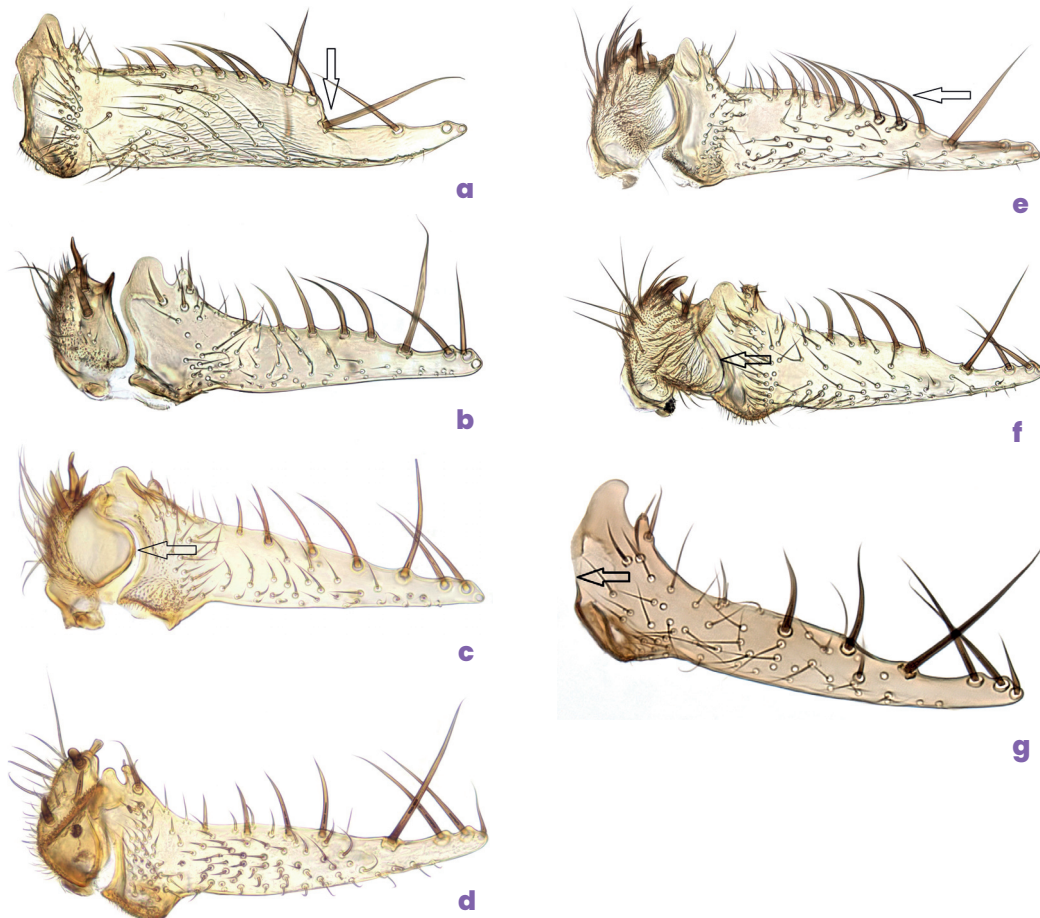


Figure 231. *Mycetophila ruficollis* group, gonostylus outer face of dorsal lobe: (a) *ruficollis*; (b) *sepulta*; (c) *ichneumonea*; (d) *uninotata*; (e) *britannica*; (f) *evanida*; (g) *idonea*.

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7. Dorsal lobe of gonostylus with sinuous and more strongly bristled posterior margin (arrowed). Female with second segment of cercus strongly widened basally. Antenna somewhat shorter and thicker than in *M. evanida*. Third palpomere more evenly ovate *britannica* Laštovka & Kidd, 1975 (p. 282)
- Dorsal lobe of gonostylus with more regular and less bristled posterior margin. [Female not examined]. Antenna more slender than in *M. britannica*. Third palpomere less ovate 8
8. Basal margin of dorsal lobe of gonostylus concave (arrowed; to similar extent as in *M. britannica*) *evanida* Laštovka, 1972 (p. 284)
- Basal margin of dorsal lobe of gonostylus (arrowed) straight or slightly convex *idonea* Laštovka, 1972 (p. 287)

KEY TO GROUP 2

1. Vein bm-m (arrowed) setulose for greater part below. Hind femur with entire dorsal margin darkened. Mid and hind tibiae with dorsal bristles including some that are more than twice apical tibial width (arrowed in Fig. 233e). Mid tibia with ventral bristles equal to corresponding dorsal bristles. Mesonotum dull, black dorsally with yellow side margins or yellow with three fused brown stripes. Mid tibia without anterodorsal bristle. 2
- Vein bm-m bare below. Hind femur dark above on no more than apical half 3

Figure 232. *Mycetophila stylata*: (a) wing; (b) vein bm-m.

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2. Gonostylus with dorsal lobe (arrowed) slender and tapered preapically (♀ not separable from *stylata*) *stylatiformis* Landrock, 1925 (p. 296)
- Gonostylus with dorsal lobe (arrowed) shorter and relatively broad preapically
..... *stylata* (Dziedzicki, 1884) (p. 295)

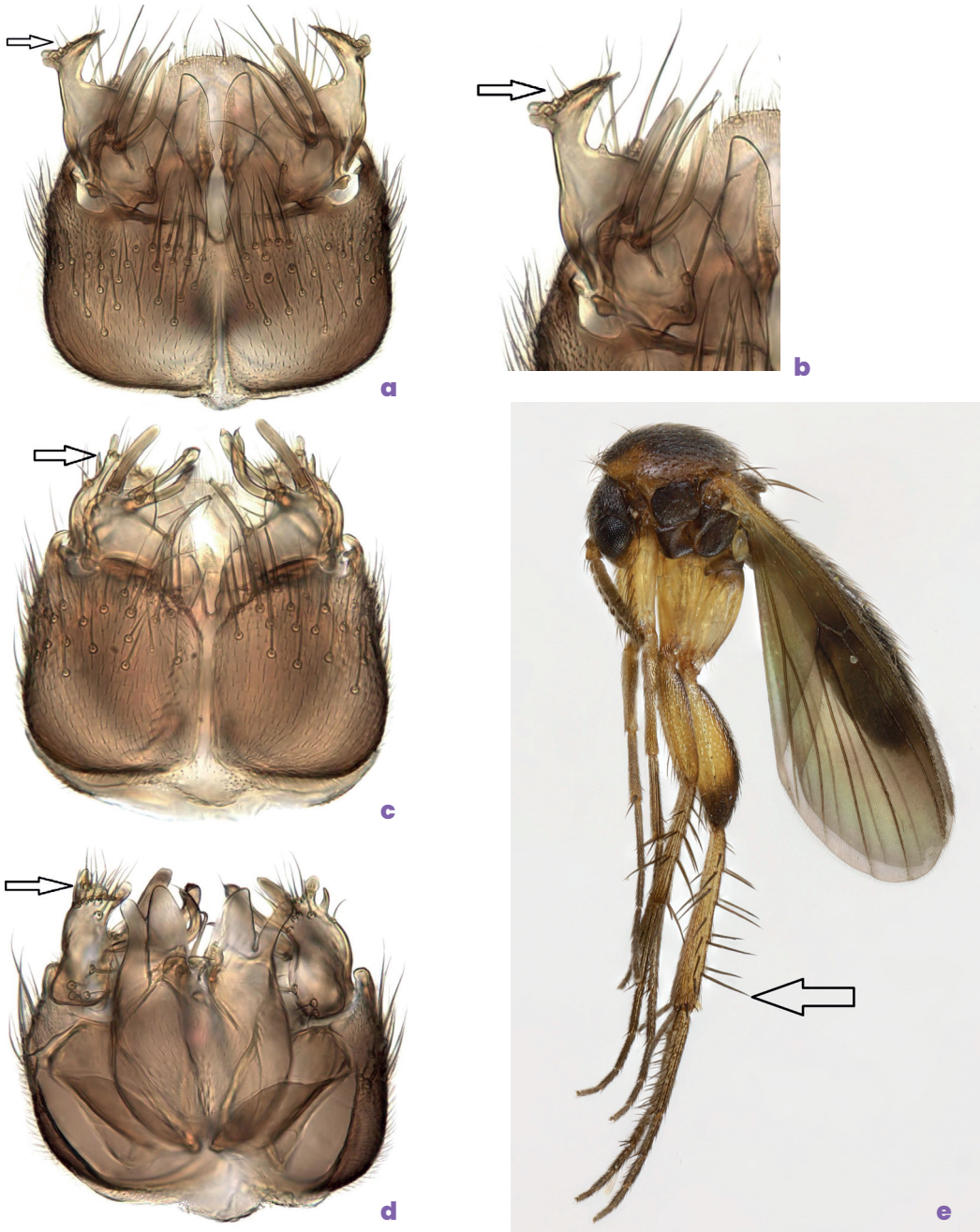


Figure 233. *Mycetophila stylatiformis*: (a) ventral view of ♂ genitalia; (b) gonostylus. *Mycetophila stylata*: (c) ventral and (d) dorsal view of ♂ genitalia (tergite 9 and cerci removed); (e) *Mycetophila stylata* ♂.

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3. Hind femur dark on about apical third. Mid tibia with an anterodorsal bristle. Tibial bristles strong, the apical bristle of each series more than twice tibial width; mid tibia with ventral bristles as long as dorsals. Mesonotum shining black with humeral areas and anterior part of median stripe broadly reddish brown *adumbrata* Mik, 1884 (p. 280)
- Hind femur not broadly dark apically. Mid tibia without anterodorsal bristle. Mid and hind tibiae with dorsal bristles shorter and mid tibia with the ventral bristles distinctly shorter than the corresponding dorsal bristles. Mesonotum dull yellow with grey dusting and three dark stripes 4

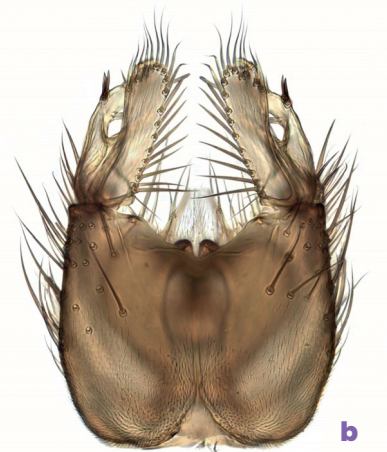


Figure 234. *Mycetophila adumbrata*: (a) wing; (b) ventral view of ♂ genitalia.

4. The shaded apical part of the wing has an elongate clear area immediately behind vein R_{4+5} . Mesonotum laterally with grey dusting, sometimes obscuring yellow ground colour except on humeral area and above the wing base *ocellus* Walker, 1848 (p. 290)

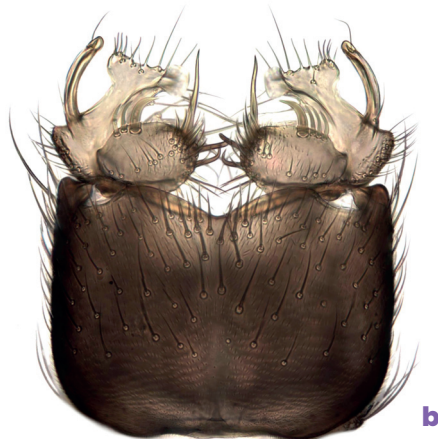


Figure 235. *Mycetophila ocellus*: (a) wing; (b) ventral view of ♂ genitalia; (c) ♂.

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- The shaded apical part of the wing without a clear area (figure of wing of *M. sordida* in key to species groups). Mid tibia with last two dorsal bristles more than twice tibial width 5
5. Dorsal lobe of gonostylus broad and blunt-ended without spinules apically, only fine bristles (arrowed). Hind femur only faintly darkened at tip or entirely yellow. Thoracic stripes more clearly separated *sordida* van der Wulp, 1874 (p. 294)
- Dorsal lobe of gonostylus narrow and more tapered on apical part, with spinules near tip (arrowed). Hind femur with narrow apical darkening extended to apical half of dorsal margin. Mesonotum darker with stripes closer together [these external characters may be variable] *czizekii* Landrock, 1911 (p. 283)

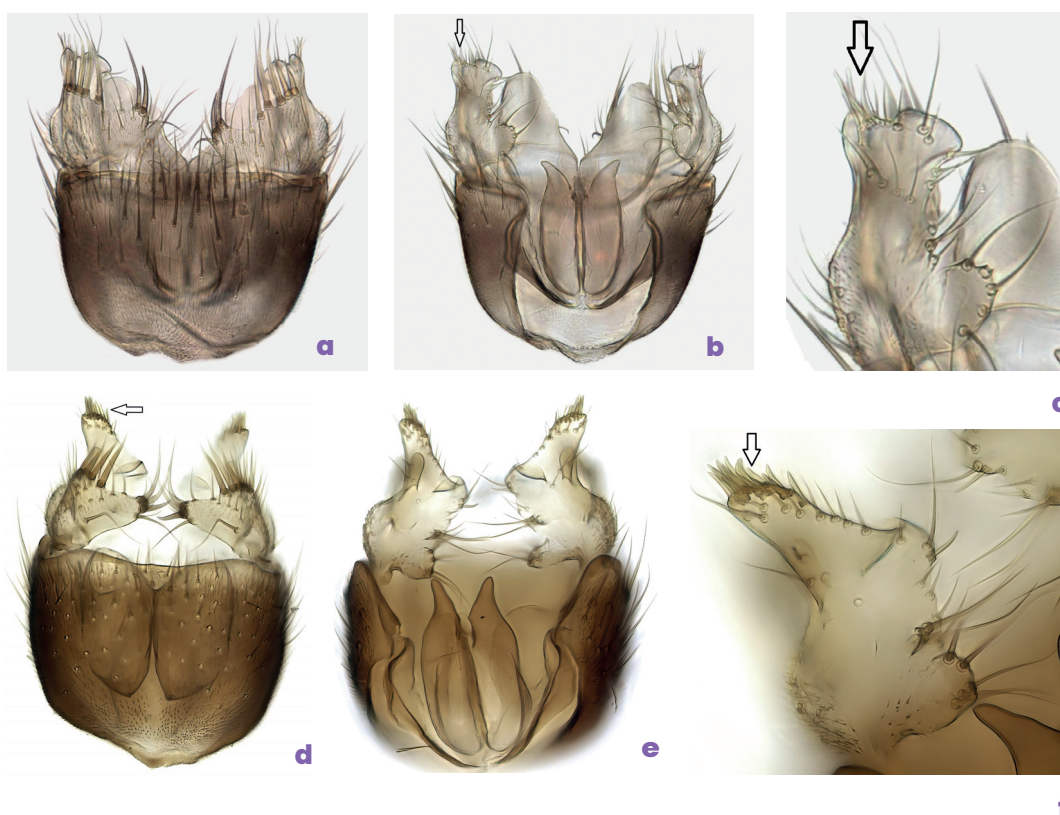


Figure 236. *Mycetophila sordida*: (a) ventral and (b) dorsal view of ♂ genitalia (tergite 9 and cerci removed); (c) dorsal lobe of gonostylus. *Mycetophila czizekii*: (d) ventral and (e) dorsal view of ♂ genitalia (tergite 9 and cerci removed); (f) dorsal lobe of gonostylus.

KEY TO GROUP 3 (*vittipes* Group)

- 1 Gonostylus with two most medial spines on ventral lobe (arrowed) situated more basally, separately from others. A larger species, wing length usually more than 5 mm. Mesonotum yellow with more or less fused dark stripes dorsally. Hind femur narrowly dark apically. Second flagellomere nearly twice as long as broad *schnablii* (Dziedzicki, 1884) (p. 292)
- Gonostylus with all spines on ventral lobe situated near apical margin. Smaller species, wing length usually less than 4 mm. Mesonotum mainly black, with more or less extensive yellow humeral areas. Hind femur usually more broadly dark apically. [Mid and hind coxae may be either yellow or mainly darkened within each species] 2

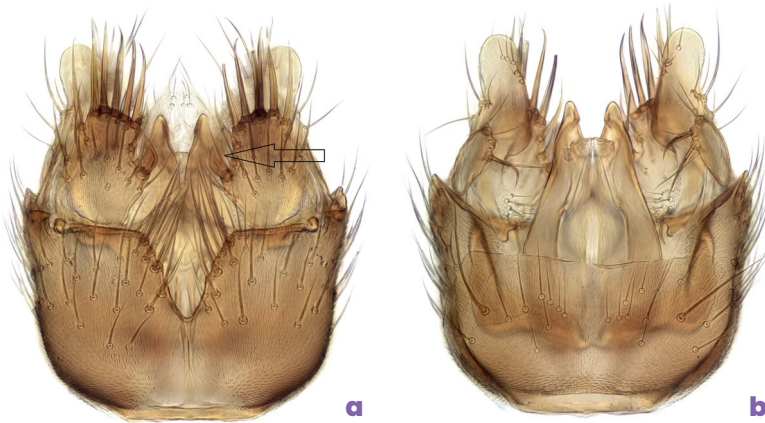


Figure 237.
Mycetophila schnablii:
(a) ventral and
(b) dorsal view of ♂
genitalia (cerci
removed).

- 2 Two most medial spines on ventral lobe of gonostylus very thick (arrowed). Antenna longer, with second and succeeding flagellomeres at least twice as long as broad. Mesonotum dull black, grey dusted, with yellow humeral areas small or absent *vittipes* Zetterstedt, 1852 (p. 298)
- The two medial spines on ventral lobe of gonostylus at most only slightly thicker than the others. Antenna shorter with median flagellomeres less than twice as long as broad 3

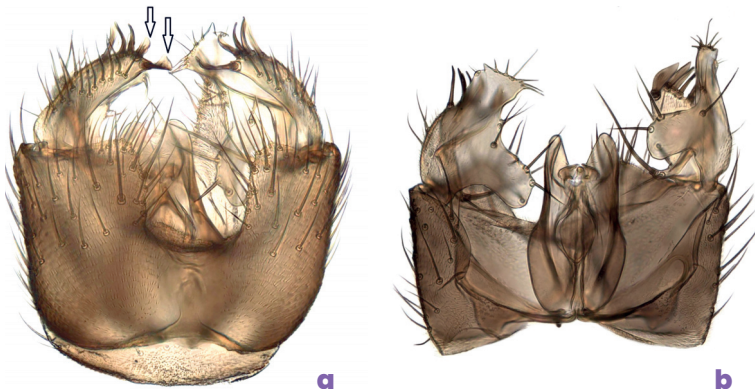


Figure 238. *Mycetophila vittipes*: (a) ventral and (b) dorsal view of ♂ genitalia (tergite 9 and cerci removed).

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3. Third and fourth apical spines (arrowed) on ventral lobe of gonostylus broader than others. Second flagellomere more than 1.5 x as long as broad, median flagellomeres nearly twice as long as broad. Mesonotum with yellow humeral areas each occupying less than a third of width and dark to fore margin medially *bohémica* (Laštovka, 1963) (p. 281)
- Third and fourth apical spines on ventral lobe of gonostylus not broader than others. Second flagellomere more or less quadrate 4



Figure 239. *Mycetophila bohémica* ventral view of ♂ genitalia.

4. Ventral lobe of gonostylus with 8-10 apical spines (arrowed). Mesonotum with broad yellow humeral areas, occupying more than a third width and with entire fore margin yellow. Median flagellomeres quadrate to 1.2 x as long as broad. Hind margin of wing clouded in some examples *gibbula* Edwards, 1925 (p. 286)
- Ventral lobe of gonostylus with at most 7 apical spines. Mesonotum almost entirely black, grey dusted with at most a slight yellow humeral marking. Hind margin of wing more or less broadly darkened 5

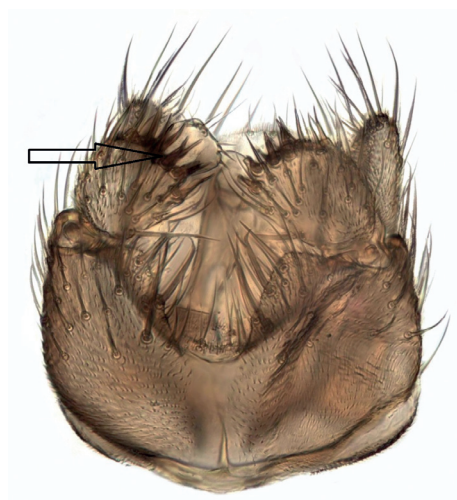


Figure 240. *Mycetophila gibbula* ventral view of ♂ genitalia.

5. Ventral lobe of gonostylus with 5 apical spines, of which the thicker first spine (arrowed) is at the same level as the other spines. Dorsal lobe of gonostylus with basal extension tapered apically (arrowed). Median flagellomeres short, only 1.2–1.3 x as long as broad, apical flagellomere about 1.5 x as long as penultimate. Hind femur usually more broadly darkened with at least the apical third dark *abiecta* (Laštovka, 1963) (p. 280)
- Ventral lobe of gonostylus with 6–7 apical spines, of which the thicker first spine (upper arrow) is narrowly more proximal than the other spines. Dorsal lobe of gonostylus with basal extension broad apically (lower arrow). Median flagellomeres longer, at least 1.4 x as long as broad, apical flagellomere up to 1.8 x as long as penultimate. Hind femur usually more narrowly dark apically *sumavica* (Laštovka, 1963) (p. 296)

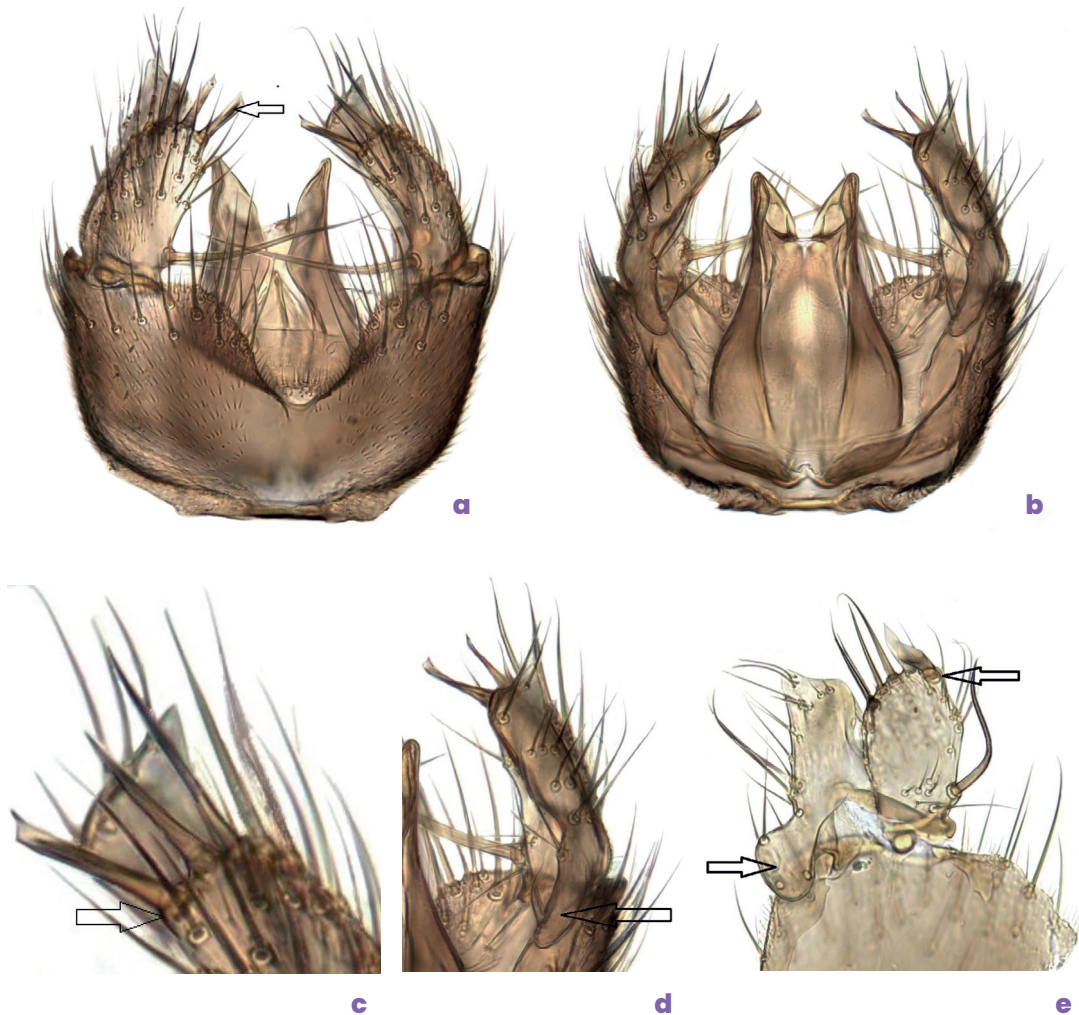


Figure 241. *Mycetophila abiecta*: (a) ventral and (b) dorsal view of ♂ genitalia (tergite 9 and cerci removed); (c) ventral lobe; (d) dorsal view of dorsal lobe. (e) *Mycetophila sumavica* gonostylus lateral view (dorsal lobe to left).

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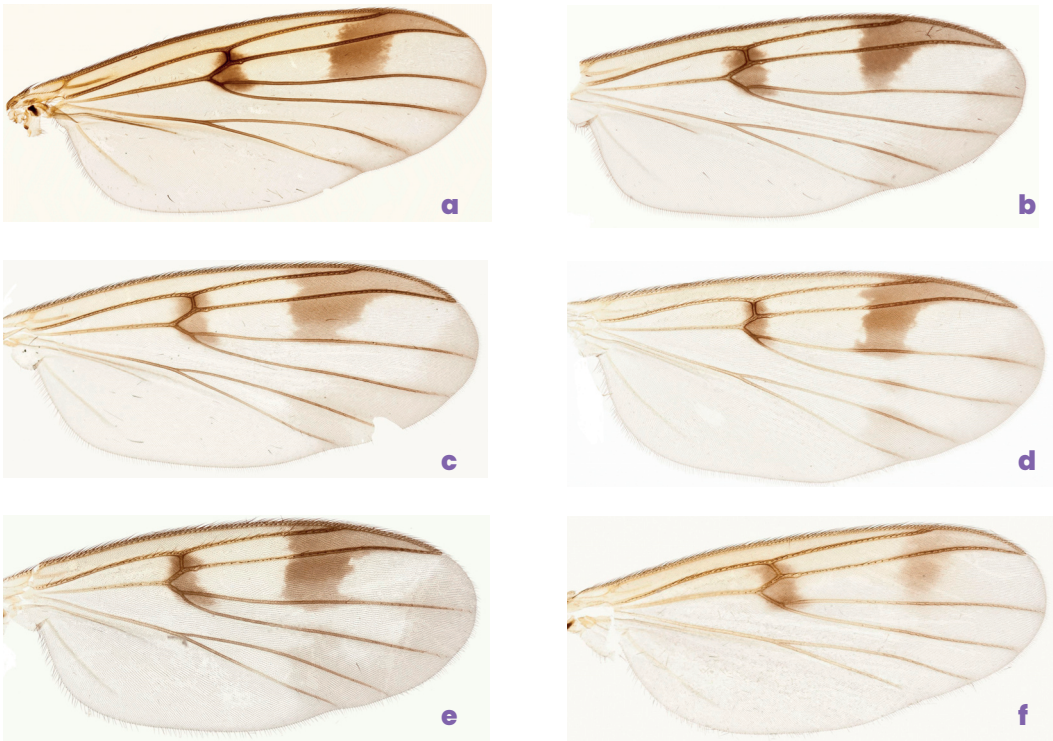


Figure 242. Wing of *Mycetophila*: (a) *schnablui*; (b) *vittipes*; (c) *bohémica*; (d) *gibbula*; (e) *abiecta*; (f) *scotica*.

KEY TO GROUP 4

- 1 Vein bm-m partly setulose below (arrowed for both species) 2
 - Vein bm-m bare below 3

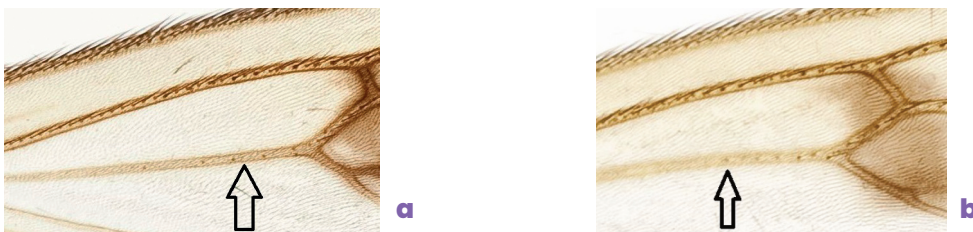


Figure 243. Wing showing vein bm-m: (a) *Mycetophila dziedickii* and (b) *Mycetophila scotica*.

2. Mid tibia with an anterodorsal bristle. Mesonotum slightly shining black with yellow humeral areas. Hind tibia with anterior setulae partly pale. Gonostylus with strong spines on ventral lobe *dzedickii* Chandler, 1977 [see GROUP 5] (p. 284)

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- Mid tibia without an anterodorsal bristle. Mesonotum dull yellow with more or less fused pale brown stripes dorsally. Hind femur narrowly dark apically, extended to apical third dorsally. Hind tibia with short bristles interspersed with the long dorsal bristles. Gonostylus with a short spine (arrowed) near base medially, otherwise with weaker bristles *scotica* Edwards, 1941 (p. 293)

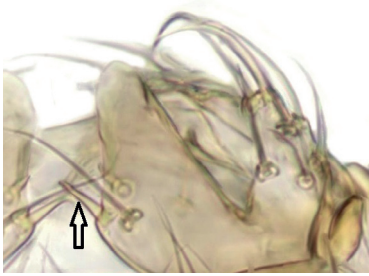


Figure 244. *Mycetophila scotica*. (a) ventral view of ♂ genitalia; (b) gonostylus.

3. Hind tibia with one anterodorsal bristle ... *trinotata* Staeger, 1840 [see GROUP 6] (p. 297)
- Hind tibia without anterodorsal bristles 4
4. Mid tibia without anterodorsal bristles [a small one sometimes present in *M. autumnalis*, keyed in both alternatives]. Hind tibia with short bristles interspersed with the long dorsal bristles 5
- Mid tibia with one anterodorsal bristle 7
5. Hind femur dark on apical third. Mesonotum dull black, grey dusted, with yellow humeral areas. Gonostylus with short spines (arrowed) apically on ventral lobe. Preapical wing marking extends on costa basal to tip of R₁. Female fore tarsi with tarsomeres 2-3 slightly thickened; cercus two-segmented *edwardsi* Lundström, 1913 (p. 284)
- Hind femur dark on less than apical quarter. Mesonotum dull, broadly yellow on sides, dark dorsally. Preapical wing marking not extending basal to tip of R₁ on costa. Female cercus one-segmented 6

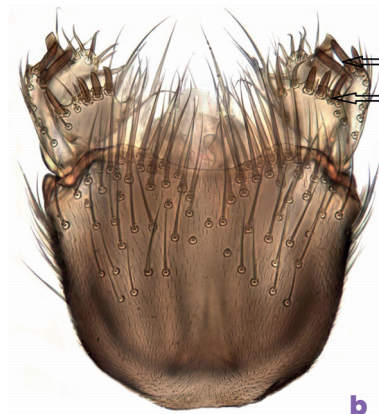


Figure 245. *Mycetophila edwardsi*. (a) wing; (b) ventral view of ♂ genitalia.

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6. Mesonotum with dark stripes fused. Preapical wing marking more distinctly separated from tip of vein R_1 , distally only reaching middle of cell r_5 . Ventral lobe of gonostylus deeply bilobed (medial branch arrowed). Female fore tarsus with tarsomeres 2-4 thickened *abbreviata* Landrock, 1914 (p. 280)
- Mesonotum with dark stripes distinct or more or less fused. Preapical wing marking touching or only narrowly distal to tip of vein R_1 , distally strong to middle of cell r_5 , faintly sinuous behind. Ventral lobe of gonostylus broad medially with two slender branches (arrowed) laterally. Female fore tarsus simple (also see couplet 10).....
..... *autumnalis* Lundström, 1909 (p. 281)

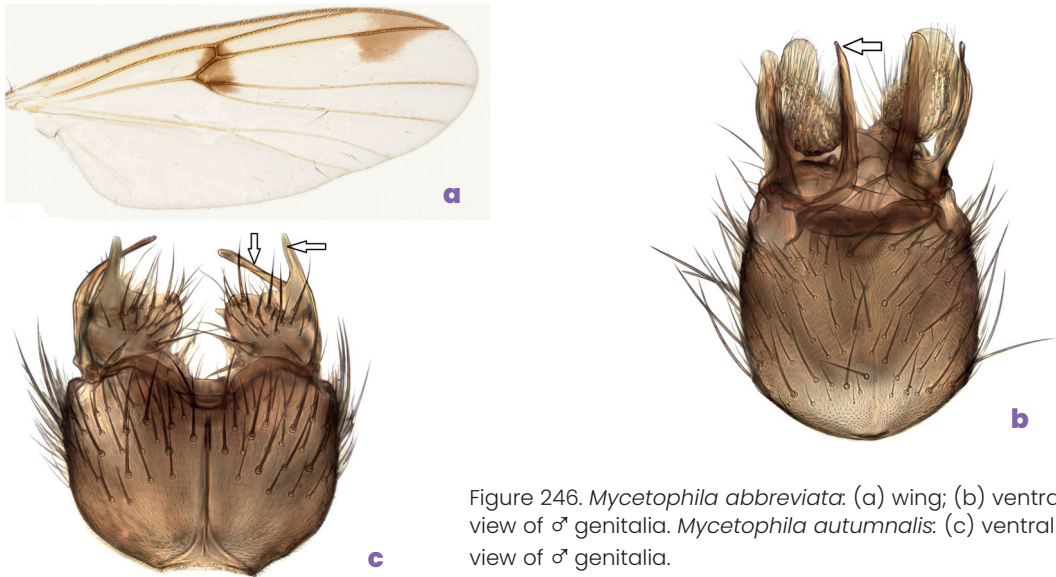


Figure 246. *Mycetophila abbreviata*: (a) wing; (b) ventral view of ♂ genitalia. *Mycetophila autumnalis*: (c) ventral view of ♂ genitalia.

7. Hind tibia usually with only long dorsal bristles [one short one in one example of *M. strigatoides*]. Mesonotum distinctly shining black, with yellow humeral areas. Female cercus two-segmented 8
- Hind tibia with short bristles interspersed with the long dorsal bristles. Mesonotum dull or slightly shining. Hind femur narrowly dark apically. Preapical wing marking extends to posterior fork, sometimes interrupted in median fork 9
8. Dorsal lobe of gonostylus (arrowed) long and tapered apically, with a broad basal portion, but without a rounded posterior flange. Both sexes with tarsomeres 2-4 of fore tarsus strongly thickened below. Hind femur dark on apical quarter to third
..... *bialorussica* Dziedzicki, 1884 (p. 281)
- Dorsal lobe of gonostylus bilobed with tapered anterior branch and a broadly rounded flange posteriorly (arrowed). Both sexes with tarsomeres 2-4 of fore tarsus narrowly but distinctly thickened. Hind femur dark on less than apical quarter (male) or about apical quarter (female) *strigatoides* (Landrock, 1927) (p. 295)

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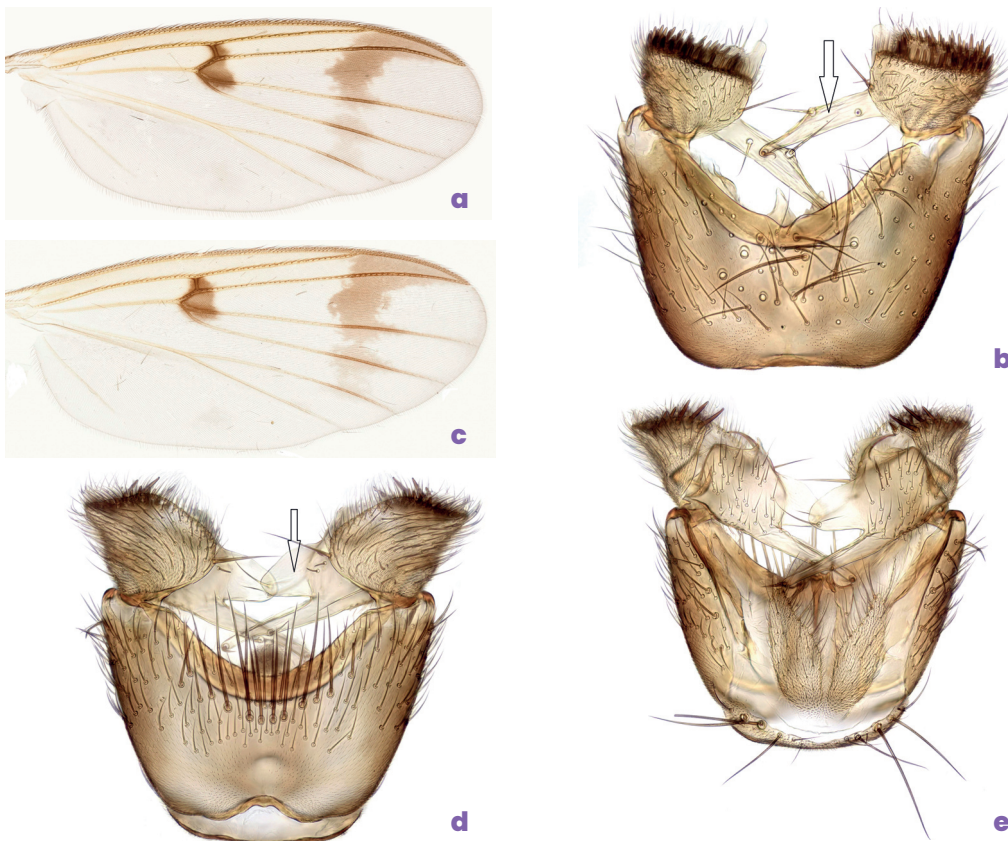


Figure 247. *Mycetophila bialorussica*: (a) wing; (b) ventral view of ♂ genitalia. *Mycetophila strigatoides*: (c) wing; (d) ventral and (e) dorsal view of ♂ genitalia.

9. Ventral lobe of gonostylus bilobed and with a strong medially directed spine (arrowed) on outer branch. Mesonotum slightly shining with dark brown fused stripes dorsally, yellow at sides and on humeral area. Female fore tarsi simple; cercus two-segmented *lubomirskii* Dziedzicki, 1884 (p. 288)
- Ventral lobe of gonostylus without strong spines. Mesonotum dull, sometimes only humeral areas yellow but more often also yellow at sides. Female cercus one-segmented 10

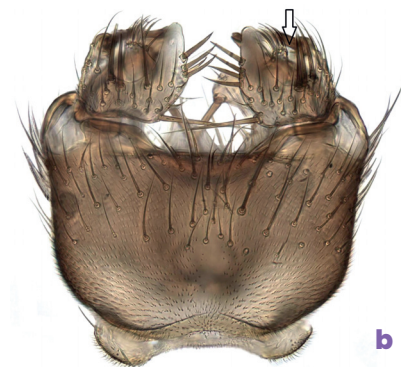


Figure 248. *Mycetophila lubomirskii*: (a) wing; (b) ventral view of ♂ genitalia.

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10. Ventral lobe of gonostylus broad medially with two slender branches (arrowed) laterally. Mid tibia with anterodorsal bristle when present relatively weak, subequal to basal anterior bristle. Mesonotum yellow with more or less fused dark stripes. Female fore tarsus simple *autumnalis* Lundström, 1909 (p. 281)
- Ventral lobe of gonostylus compact without branches. Mid tibia with anterodorsal bristle better developed. Female fore tarsus with tarsomeres 2-4 thickened 11

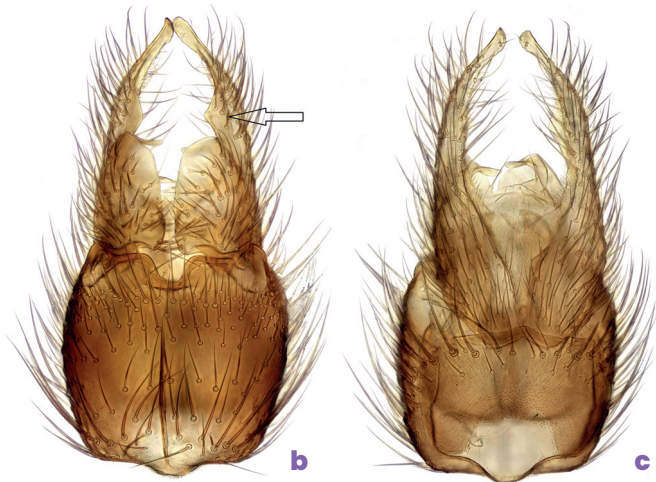
Figure 249. *Mycetophila autumnalis* wing. (See Figure 246 for male and Figure 252 for female.)



11. Both sexes with cerci elongate, in male (arrowed) extending well beyond gonostyli. Mesonotum dark with yellow humeral areas. Preapical wing marking ends in middle of cell r_5 (arrowed) *forcipata* Lundström, 1913 (p. 285)
- Both sexes with cerci relatively shorter, in male not extending beyond gonostyli. Preapical wing marking strong to middle of cell r_5 but faintly extended to hind margin 12



Figure 250. *Mycetophila forcipata*. (a) wing; (b) ventral and (c) dorsal views of ♂ genitalia. (See Figure 252 for female.)



12. Mesonotum humped in middle, in lateral view as high as pleura, mainly yellow with three more or less distinct dark stripes dorsally. Hind femur dark on apical quarter ...
..... *tridentata* Lundström, 1911 (p. 296)

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- Mesonotum more evenly rounded above, not higher than pleura in lateral view; variable in colour, sometimes as in *M. forcipata* but often more or less extensively yellow at sides with more or less fused dark stripes dorsally. Hind femur more narrowly darkened apically *pictula* Meigen, 1830 (p. 292)

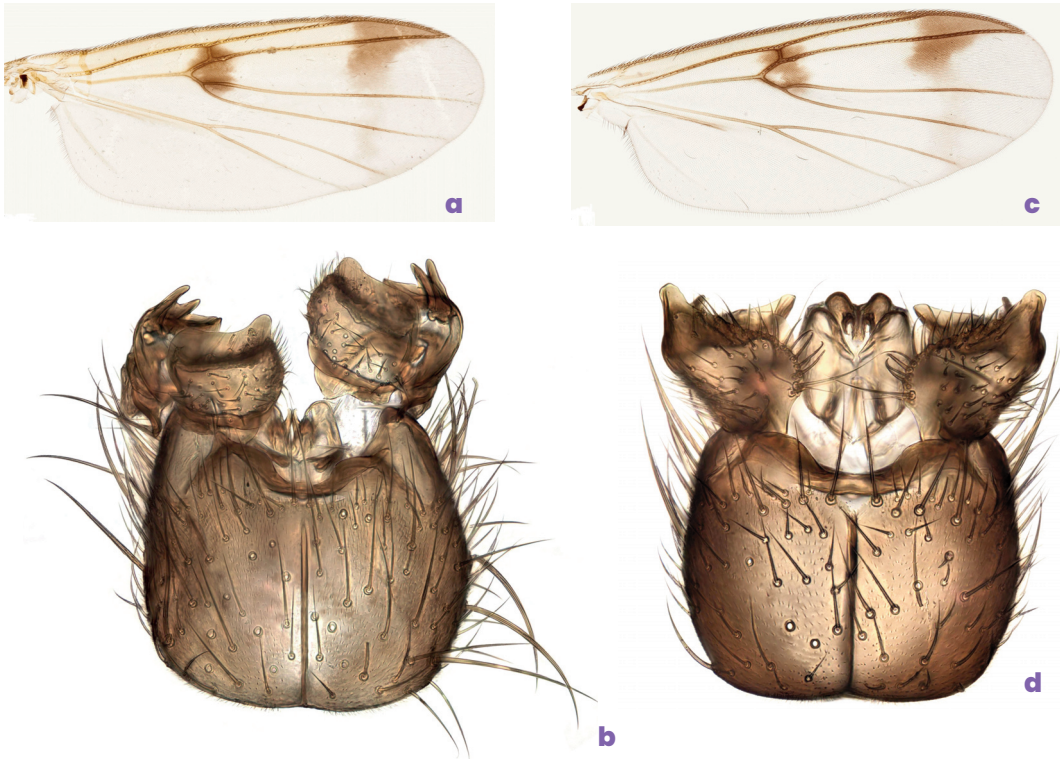


Figure 251. *Mycetophila tridentata*: (a) wing, (b) ventral view of ♂ genitalia. *Mycetophila pictula*: (c) wing, (d) ventral view of ♂ genitalia, aedeagus displaced above.

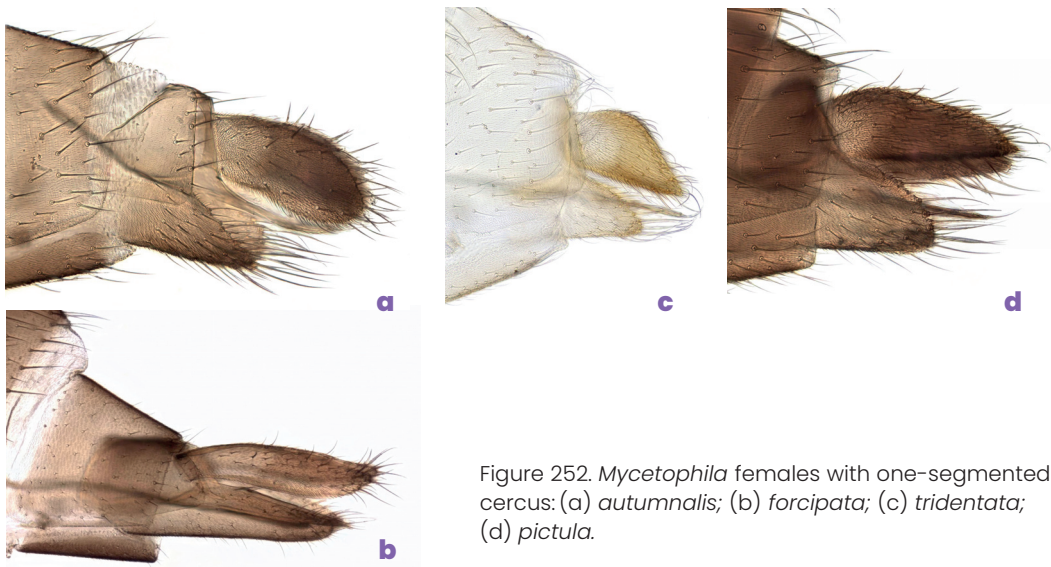


Figure 252. *Mycetophila* females with one-segmented cercus: (a) *autumnalis*; (b) *forcipata*; (c) *tridentata*; (d) *pictula*.

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KEY TO GROUP 5

1. Hind tibia with 6–10 short fine posterior bristles on apical part. Wing with central spot only. Mesonotum strongly shining (a distinction from the *ruficollis* group which have similarly marked wings, but a dull thorax) yellow to brown with three more or less fused dark brown stripes. Hind femur narrowly dark apically. Mid and hind tibia with anterior setulae mainly brown. Mid tibia with anterodorsal bristle. Female with fore tarsus simple and two-segmented cercus 2

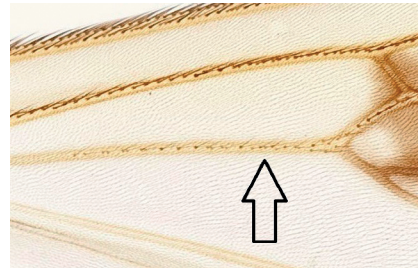


Figure 253. (a) *Mycetophila unipunctata* ♂; (b) *Mycetophila confusa* vein bm–m.

- Hind tibia with 0–4 weak posterior bristles on apical part. Wing usually with more or less distinct preapical marking (faint or absent in *M. mitis*) 3
2. Male with ventral lobe of gonostylus bearing 2 strong spines (arrowed) apically. First row of anterior setulae (the row nearest to anterior bristles) on hind tibia dark brown in contrast to other rows. Second flagellomere more than twice as long as broad (male) or more than 1.5 x as long as broad (female) *unipunctata* Meigen, 1818 (p. 297)
- Male with ventral lobe of gonostylus bearing only some long bristles (arrowed). All setulae on hind tibia light brown. Second flagellomere less than twice as long as broad (male) or less than 1.5 x as long as broad (female) *confusa* Dziedzicki, 1884 (p. 283)

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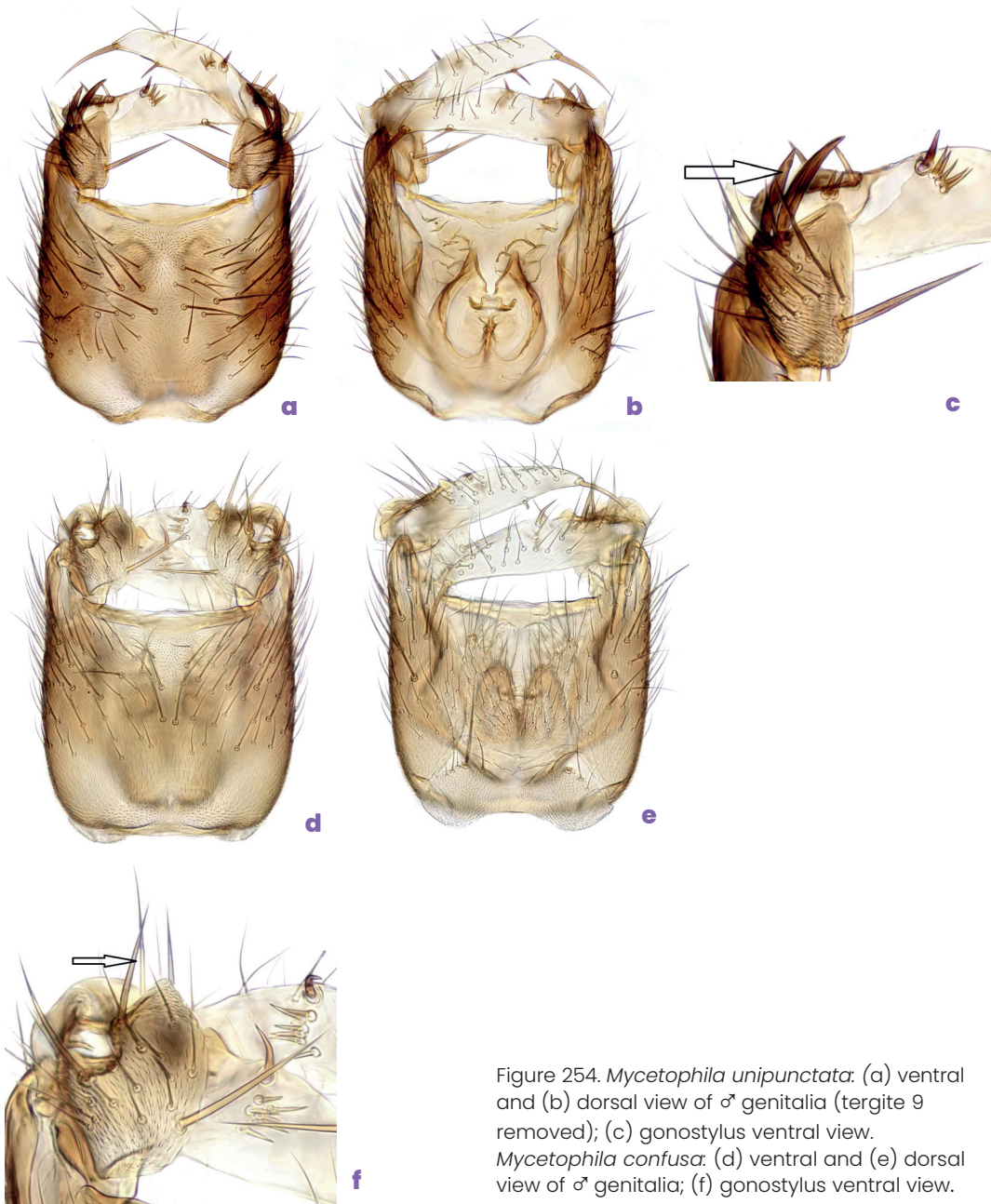


Figure 254. *Mycetophila unipunctata*: (a) ventral and (b) dorsal view of ♂ genitalia (tergite 9 removed); (c) gonostylus ventral view. *Mycetophila confusa*: (d) ventral and (e) dorsal view of ♂ genitalia; (f) gonostylus ventral view.

3. Hind tibia with only first row of anterior setulae (the row nearest to anterior bristles) entirely dark brown, the other rows partly or entirely light brown to yellow. Preapical wing marking distinct. Mesonotum faintly shining black with yellow humeral areas. Mid tibia with one anterodorsal bristle 4
- Mid and hind tibia with all anterior setulae dark. Preapical wing marking weak or absent, if present reaching middle of cell r_5 . Hind coxa with short posterior setulae 5

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4. Gonostylus with ventral lobe deeply bilobed, with strong spines on both branches (arrowed: structure similar to *M. lunata* (GROUP 9); *lunata* has similar spines on the dorsal part, but differs in having only a cluster of short spinules subapically on its ventral part, which is shorter and broader). Preapical wing marking distinct to middle of cell r_5 , then extending more faintly across vein M_1 . Hind tibia with second row of anterior setulae only dark near tip. Mid tibia with 3 ventral bristles. Female fore tarsus simple *dziedzickii* Chandler, 1977 (p. 284)
- Gonostylus with ventral lobe not deeply bilobed, without spines but a row of strong bristles (arrowed) on outer margin. Preapical wing marking more or less faint, not distinctly extending further than middle of cell r_5 . Hind tibia with second row of anterior setulae dark on apical half to two thirds. Mid tibia usually with 2 (sometimes 3) ventral bristles *strigata* Staeger, 1840 (p. 295)

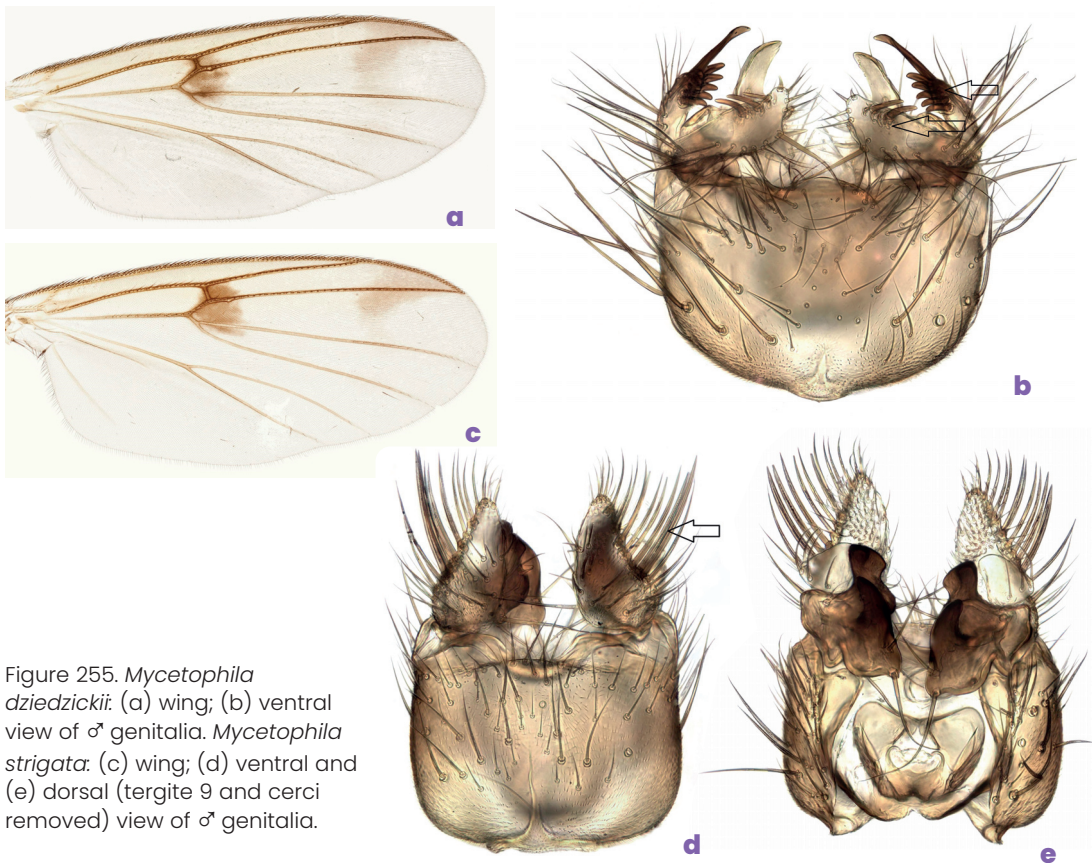


Figure 255. *Mycetophila dziedzickii*: (a) wing; (b) ventral view of σ genitalia. *Mycetophila strigata*: (c) wing; (d) ventral and (e) dorsal (tergite 9 and cerci removed) view of σ genitalia.

5. Second flagellomere more than 1.5 x as long as broad. Mesonotum dull, with yellow sides and three broad dark stripes dorsally, which are fused behind. Preapical wing marking faint or absent and central wing spot may also be faint. Hind femur narrowly dark apically, extended to the apical third dorsally. Mid tibia without an anterodorsal bristle or a short one present (latter the case in most examples seen). Ventral lobe of gonostylus with some spinules on a short process dorsally (arrowed). Female fore tarsus with tarsomeres 2-4 thickened *mitis* (Johannsen, 1912) (p. 290)

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- Second flagellomere more quadrate. Mesonotum more or less shining black with yellow humeral areas more or less developed and narrow yellow fore margin. Hind femur dark on apical quarter..... 6

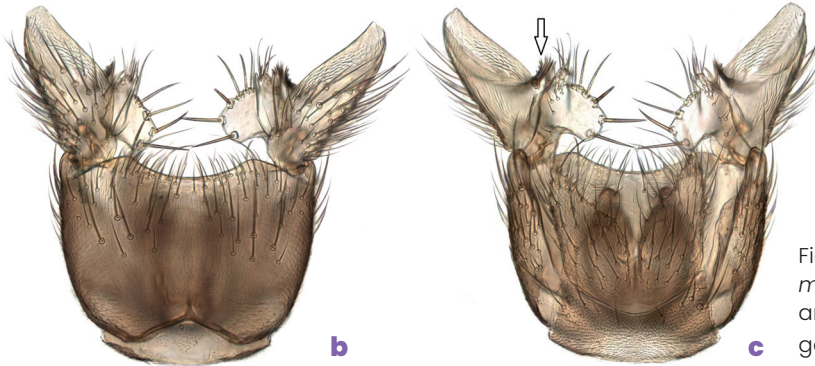


Figure 256. *Mycetophila mitis*: (a) wing; (b) ventral and (c) dorsal views of ♂ genitalia.

6. Mid tibia with an anterodorsal bristle present. Ventral lobe of gonostylus (arrowed) with lateral part more elongate, exceeding half length of gonocoxites. Female fore tarsus simple ...
..... *stolida* Walker, 1856 (p. 295)



- Mid tibia without an anterodorsal bristle. Ventral lobe of gonostylus (arrowed) with lateral part shorter, less than half length of gonocoxites
..... *freyii* Lundström, 1909 (p. 285)

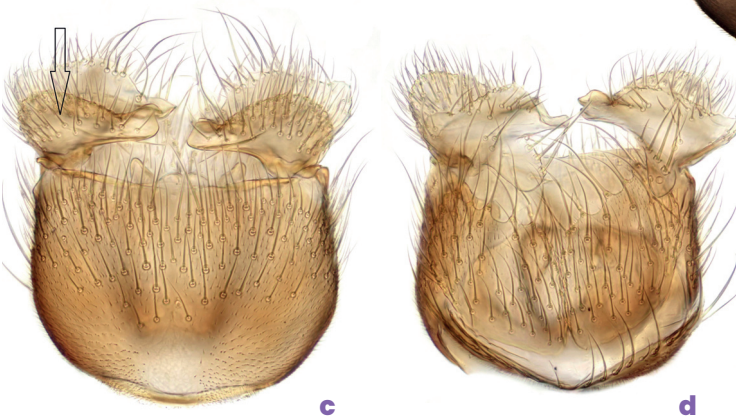


Figure 257. *Mycetophila stolida*: (a) wing; (b) ventral view of ♂ genitalia. *Mycetophila freyii*: (c) ventral and (d) dorsal view of ♂ genitalia.

KEY TO GROUP 6

1. Hind tibia with only one anterodorsal bristle. Mesonotum dull yellow with more or less fused dark stripes. Mid and hind tibiae with anterior setulae brown. Hind tibia with short bristles interspersed with long dorsal bristles. Preapical wing marking distinct to vein M_1 or ending in middle of cell r_5 . Female with fore tarsus simple, with tarsomeres 3–4 very slightly thickened *trinotata* Staeger, 1840 (p. 297)
- Hind tibia with 2 or more anterodorsal bristles. Mesonotum more or less shining 2
2. Hind tibia with 2 anterodorsal bristles. Mesonotum reddish brown with faintly indicated brown stripes. Mid tibia with first row of anterior setulae brown. Hind tibia with only a few brown setulae in first row, other rows entirely yellow and with only long dorsal bristles. Preapical wing marking reaching middle of cell r_5 . Female fore tarsus simple *confluens* Dziedzicki, 1994 (p. 283)
- Hind tibia with 4–6 anterodorsal bristles. Thorax otherwise 3

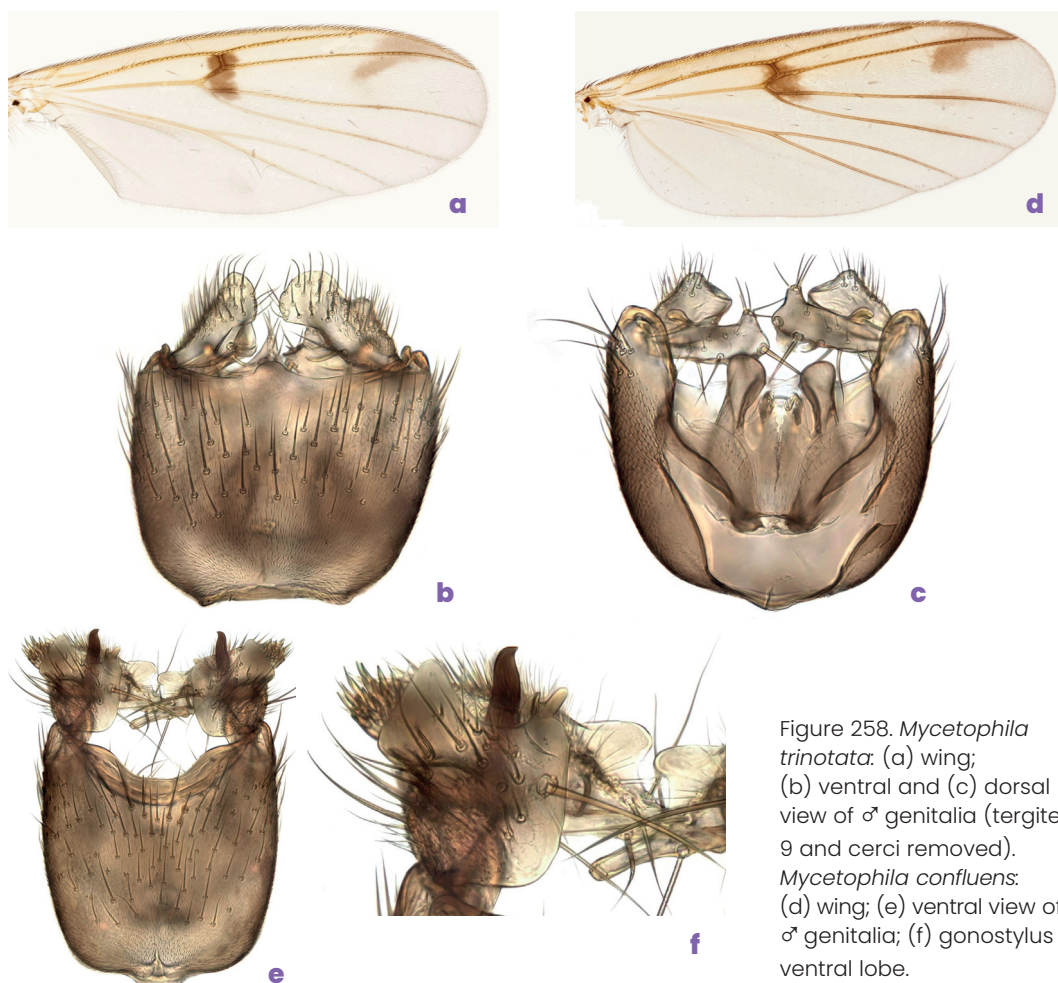


Figure 258. *Mycetophila trinotata*: (a) wing; (b) ventral and (c) dorsal view of ♂ genitalia (tergite 9 and cerci removed). *Mycetophila confluens*: (d) wing; (e) ventral view of ♂ genitalia; (f) gonostylus ventral lobe.

3. Mesonotum entirely dark. Wing with central spot faint or absent and preapical marking absent. Hind tibia with 4 anterodorsal bristles and short bristles interspersed with long dorsal bristles. Mid and hind tibiae with all anterior setulae dark. Hind femur dark on apical quarter to third. Gonostylus with a close-set pair of long bristles (arrowed) medially on ventral lobe. Female fore tarsus with tarsomeres 2-4 very thick *immaculata* (Dziedzicki, 1884) (p. 287)
- Mesonotum at least partly yellow. Wing markings distinct, including central spot and preapical band. Mid and hind tibiae with anterior setulae yellow. Hind tibia with only long dorsal bristles 4

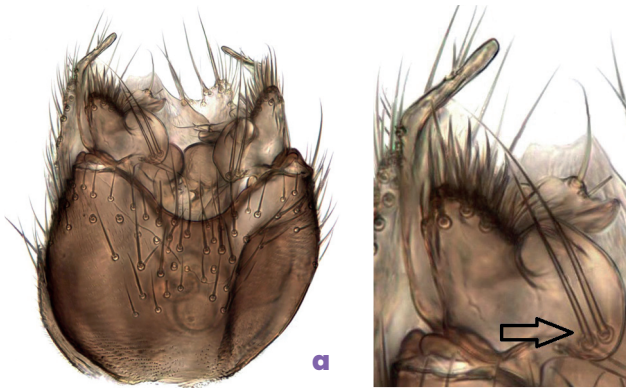


Figure 259. *Mycetophila immaculata*: (a) ventral view of ♂ genitalia; (b) gonostylus ventral lobe.

4. Mesonotum strongly shining black with yellow humeral areas. Hind femur black on apical quarter to third. Preapical wing marking strong only to M_1 , only narrowly separated from vein R_1 in some examples. Mid tibia with 1 anterodorsal bristle. Hind tibia with 4-5 anterodorsal bristles and 0-1 short and weak posterior bristles near tip [female not seen] *morosa* Winnertz, 1864 (p. 290)
- Mesonotum strongly shining yellow or with more or less distinct brown stripes. Hind femur narrowly dark apically. Mid tibia with 1-3 anterodorsal bristles. Hind tibia with 4-6 anterodorsal bristles and 5-14 short posterior bristles on apical half. Preapical wing marking sinuous, extending across median fork 5

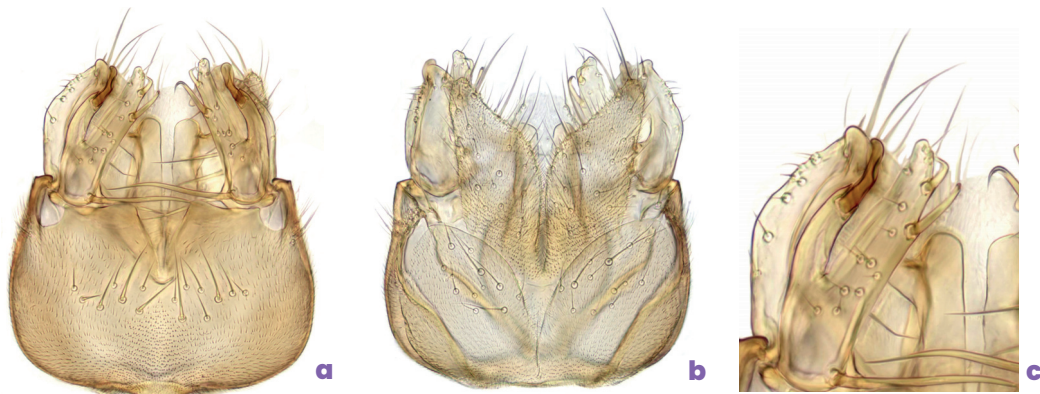


Figure 260. *Mycetophila morosa*: (a) ventral and (b) dorsal views of ♂ genitalia; (c) gonostylus ventral lobe.

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5. Mainly orange yellow, with dark markings on abdomen. Male gonocoxites with broad bare area (lower arrow) apically; gonostylus with ventral lobe quadrate (middle arrow), with some spinules (upper arrow) on apical margin. Female fore tarsus with tarsomeres 2-4 more or less thickened ventrally *cingulum* Meigen, 1830 (p. 282)
- Thorax with brown markings, abdomen mainly dark. Male: gonocoxites shorter, with apical bare depressed area (lower arrow) shallower; gonostylus with ventral lobe more transverse and rounded medially (upper arrow), without spinules apically. Female fore tarsus with tarsomeres slender *sigmoides* Loew, 1869 (p. 293)

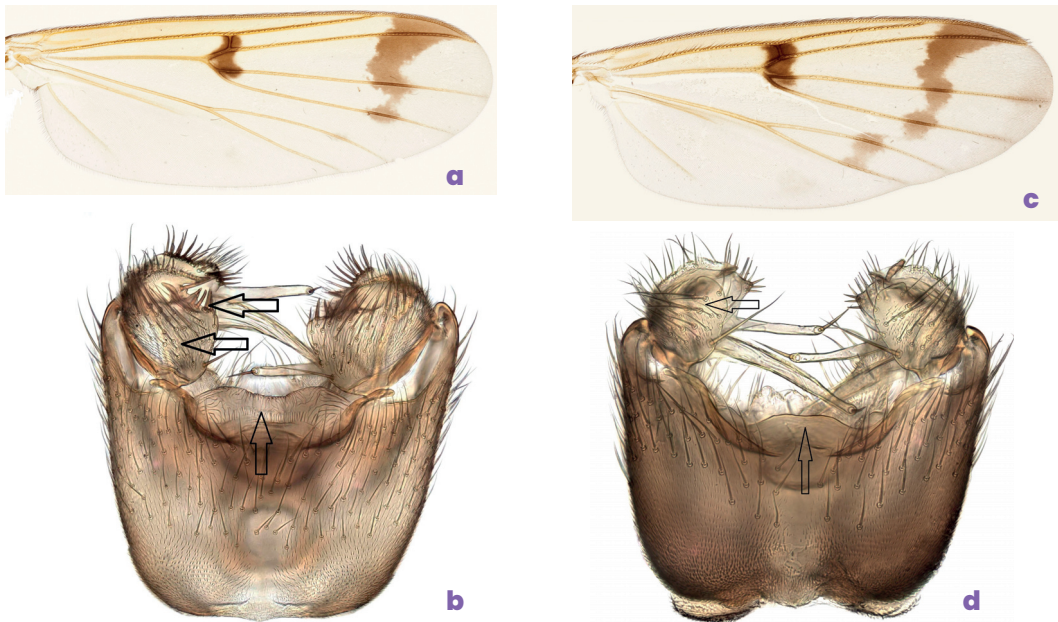


Figure 261. *Mycetophila cingulum*: (a) wing; (b) ventral view of view of ♂ genitalia. *Mycetophila sigmoides*: (c) wing; (d) ventral view of view of ♂ genitalia.

KEY TO GROUP 7

1. Preapical wing marking absent; median spot more or less distinct, sometimes absent. Body entirely shining black. Hind femur narrowly dark apically. Female fore tarsus with tarsomeres 2-3 thickened *unicolor* Stannius, 1831 (p. 297)
- Preapical wing marking present. Female fore tarsus slender [where known] 2
2. Hind femur dark on apical third. Preapical wing marking sinuous, extending over median fork but sometimes interrupted within fork. A more or less distinct dark patch on wing membrane behind posterior fork. Mid tibia with 3 ventral bristles 3
- Hind femur only narrowly dark at tip. Hind tibia with apical two fifths of second row of anterior setulae dark 5

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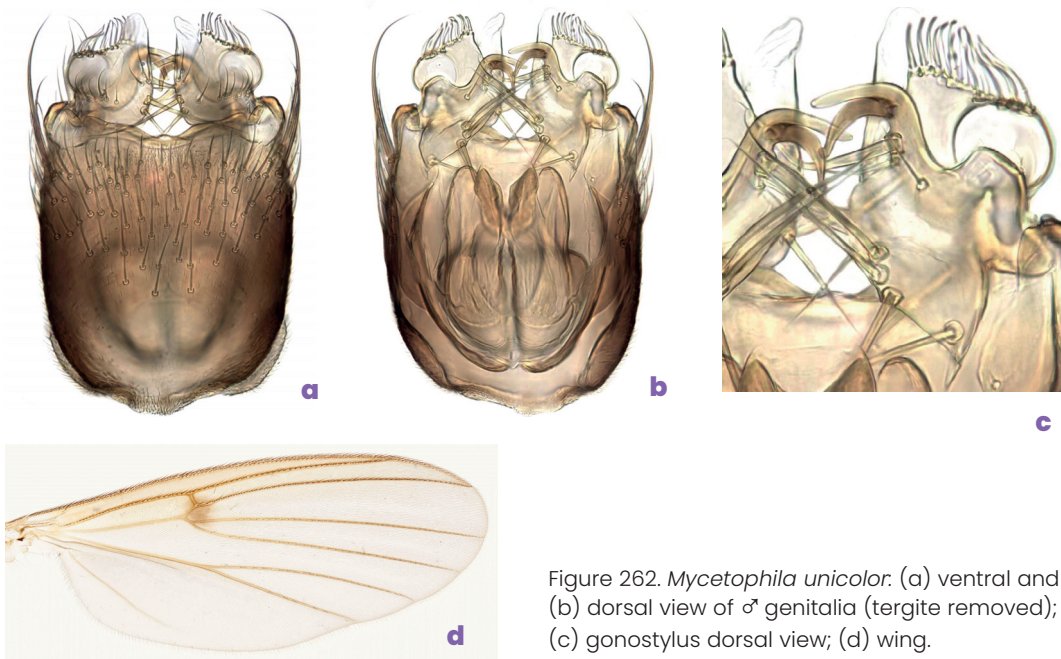


Figure 262. *Mycetophila unicolor*. (a) ventral and (b) dorsal view of ♂ genitalia (tergite removed); (c) gonostylus dorsal view; (d) wing.

3. Vein bm-m with 3-12 setulae below apical part. Gonocoxites not contracted apically and without longer bristles medially *eppingensis* Chandler, 2001 (p. 284)
- Vein bm-m without setulae. Gonocoxites contracted apically, with long bristles medially. Ventral lobe of gonostylus apically bilobed with a strong spine on each lobe 4

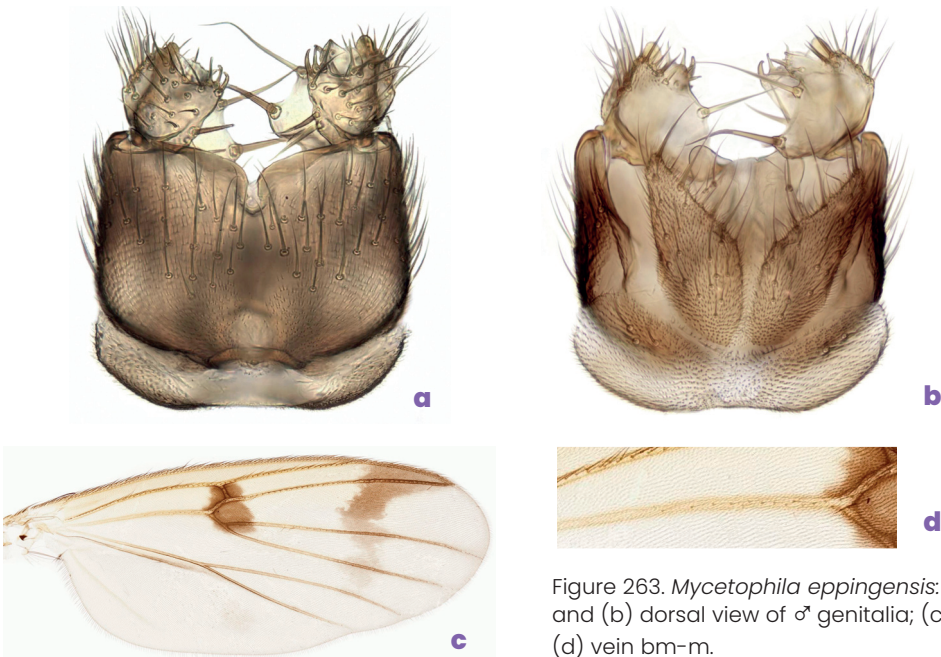


Figure 263. *Mycetophila eppingensis*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) wing; (d) vein bm-m.

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4. Mesonotum entirely shining black. Second flagellomere more or less quadrate. Cerci (arrowed) elongate, extending well beyond gonostyli *lapponica* Lundström, 1906 (p. 288)
- Mesonotum shining black with large yellow humeral areas, occupying more than a third of its width. Cerci (portion visible in ventral view arrowed) not extending well beyond gonostyli. Aedeagus (arrowed in dorsal view) elongate, as long as gonocoxites *uliginosa* Chandler, 1988 (p. 297)

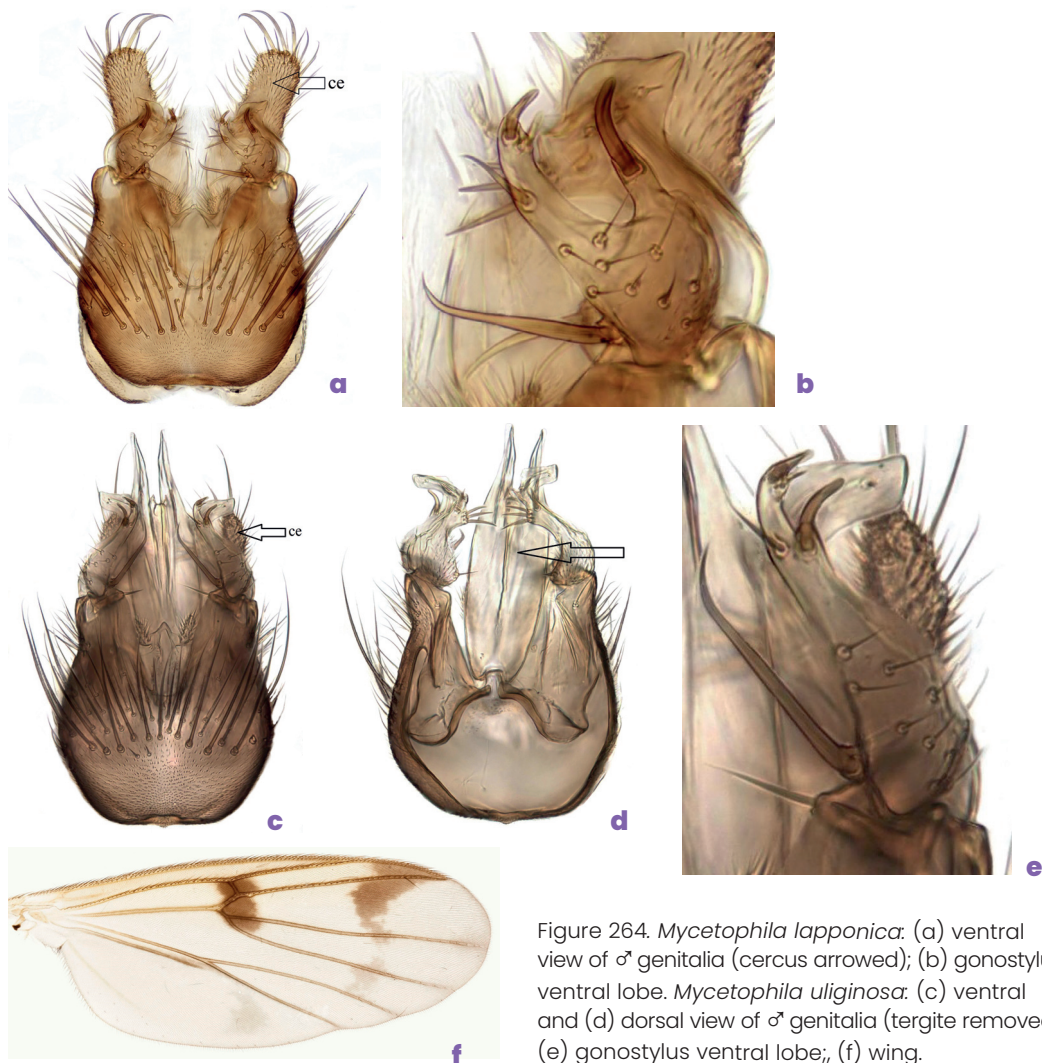


Figure 264. *Mycetophila lapponica*: (a) ventral view of ♂ genitalia (cercus arrowed); (b) gonostylus ventral lobe. *Mycetophila uliginosa*: (c) ventral and (d) dorsal view of ♂ genitalia (tergite removed), (e) gonostylus ventral lobe; (f) wing.

5. Mesonotum dull to faintly shining black with more or less yellow humeral areas. Mid tibia with 2 ventral bristles. Hind tibia with 4-7 short posterior bristles near tip. Gonostylus with ventral lobe elongate and bearing strong bristles apically and on medial edge (both groups of bristles arrowed in ventral view) *luctuosa* Meigen, 1830 (p. 289)

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- Mesonotum shining black or dark brown with small yellow humeral areas. Mid tibia with 3 ventral bristles. Hind tibia with 1-2 short posterior bristles near tip. Gonostylus with ventral lobe broader than long and bearing apically 2 short blunt spines and a longer pointed spine (arrowed) which is bent medially near its base
..... *deflexa* Chandler, 2001 (p. 283)

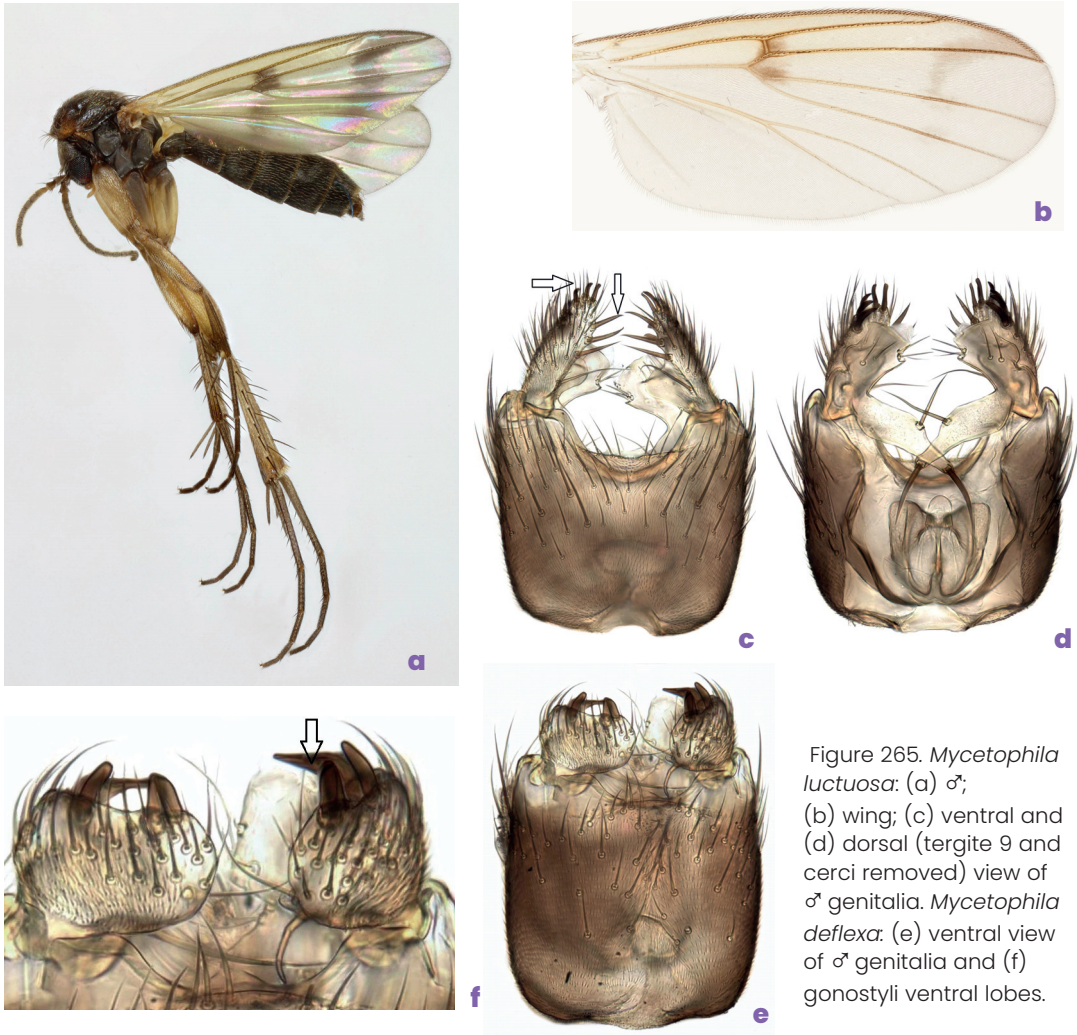


Figure 265. *Mycetophila luctuosa*: (a) ♂; (b) wing; (c) ventral and (d) dorsal (tergite 9 and cerci removed) view of ♂ genitalia. *Mycetophila deflexa*: (e) ventral view of ♂ genitalia and (f) gonostyli ventral lobes.

KEY TO GROUP 8

1. Mid tibia with first two rows of anterior setulae in front of anterior bristles brown. Vein bm-m may have 1-2 setulae near tip below. Mesonotum shining black with yellow humeral areas 2
- Mid tibia with only first row of anterior setulae brown. Vein bm-m without setulae. Preapical wing band reaching costa and distinct to middle of cell r_5 , more or less faint behind 3

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2. Ventral lobe of gonostylus (arrowed) without spines. Preapical wing marking distinct from middle of cell r_1 almost to M_1 (and sometimes continued beyond) but distinctly separated from costa (arrowed). Female fore tarsus with tarsomeres 2-3 a little thickened below *rudis* Winnertz, 1864 (p. 292)
- Ventral lobe of gonostylus with short spines apically (upper arrow) and long spines on medial edge (lower arrow). Preapical wing marking reaching costa and more or less extending over the median fork. Female fore tarsus simple *dentata* Lundström, 1913 (p. 283)



Figure 266. *Mycetophila rudis*: (a) wing; (b) ventral view of ♂ genitalia; (c) ♂. *Mycetophila dentata* (d) wing; (e) gonostyli ventral; (f) *Mycetophila signatoides* ♂.

3. Mesonotum shining black with yellow humeral areas. Abdomen entirely black or tergites with yellow markings more or less extensive on hind margins but without a yellow mid line. Hypandrial lobe present 4
 - Mesonotum mainly shining yellow with dark stripes more or less fused dorsally, but median stripe sometimes faintly indicated, giving a two-striped appearance. Abdomen more or less yellow including fore and hind margins of tergites, usually with yellow mid line on tergites 2-3 (occasionally absent in *M. subsigillata*) 5
4. Hypandrial lobe (arrowed) large and broad basally, tapered apically without lateral projections. Hind tibia with first row of anterior setulae only brown in middle part, remaining anterior setulae otherwise yellow. Scutellum broadly yellow medially *blanda* Winnertz, 1864 (p. 281)
 - Hypandrial lobe with a rectangular lateral projection (arrowed) on each side of a tapered apically rounded medial part. Hind tibia with first row of anterior setulae more extensively brown, almost to tip. Scutellum dark except for a small pale central patch *stricklandi* (Laffoon, 1957) (p. 295)

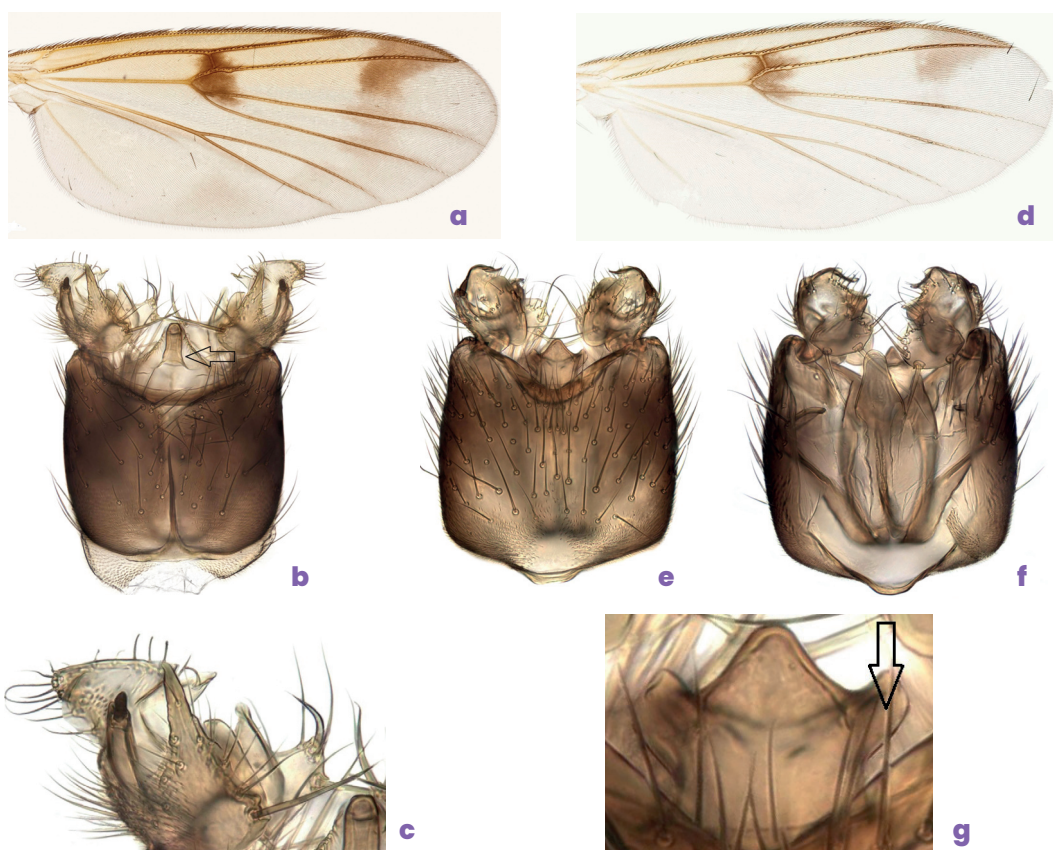


Figure 267. *Mycetophila blanda*: (a) wing; (b) ventral view of σ genitalia; (c) gonostylus and hypandrial lobe. *Mycetophila stricklandi*: (d) wing; (e) ventral and (f) dorsal view of σ genitalia (tergite 9 removed); (g) hypandrial lobe.

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5. Hind tibia with anterior setulae entirely yellow. Gonostylus with ventral lobe short and transverse basally, tapered to a slender pointed branch (left arrow) medially, and with a very long internally directed bristle basally (right arrow). Female fore tarsus simple *alea* Laffoon, 1965 (p. 280)

- Hind tibia with first row of anterior setulae at least partly brown in middle. Gonostylus with ventral lobe either broadly rounded apically without any branches or deeply bilobed; without any very long bristles 6

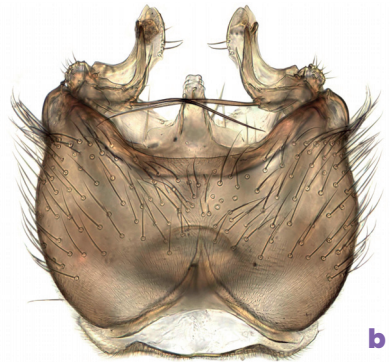
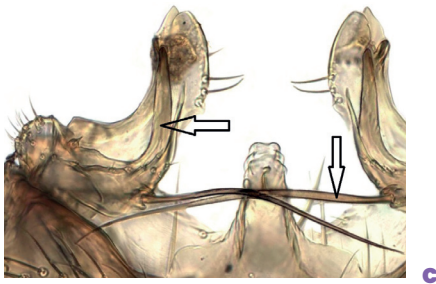


Figure 268. *Mycetophila alea*: (a) wing, (b) ventral view of ♂ genitalia; (c) gonostylus and hypandrial lobe.

6. Male with ventral lobe of gonostylus broadly rounded apically and not bilobed, bearing spinose bristles (arrowed) near apical margin. Gonocoxites concave medially, hypandrial lobe absent. Tergites 2-5 with yellow mid line. Female cercus with apical segment small but elongate, about half length of basal segment *signata* Meigen, 1830 (p. 293)

- Male with ventral lobe of gonostylus bilobed, with a blunt spine apically on the outer branch. Gonocoxites more broadly concave apically, with a hypandrial lobe present (as in *blanda*, *alea* and *stricklandi*). Often only tergites 2-3 with yellow mid line 7



Figure 269. *Mycetophila signata*: (a) wing; (b) ventral view of ♂ genitalia; (c) gonostylus.

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7. Gonostylus with medial branch of ventral lobe broadly rounded apically (arrowed). Median thoracic stripe usually distinct. Female fore tarsus with tarsomeres 2-4 thickened *subsigillata* Zaitzev, 1999 (p. 296)
- Gonostylus with medial branch of ventral lobe narrow (arrowed in ventral view and in figure of gonostylus). Median thoracic stripe often indistinct. Female fore tarsus simple; cercus with apical segment ovate but only about a third length of basal segment *signatoides* Dziedzicki, 1884 (p. 294)

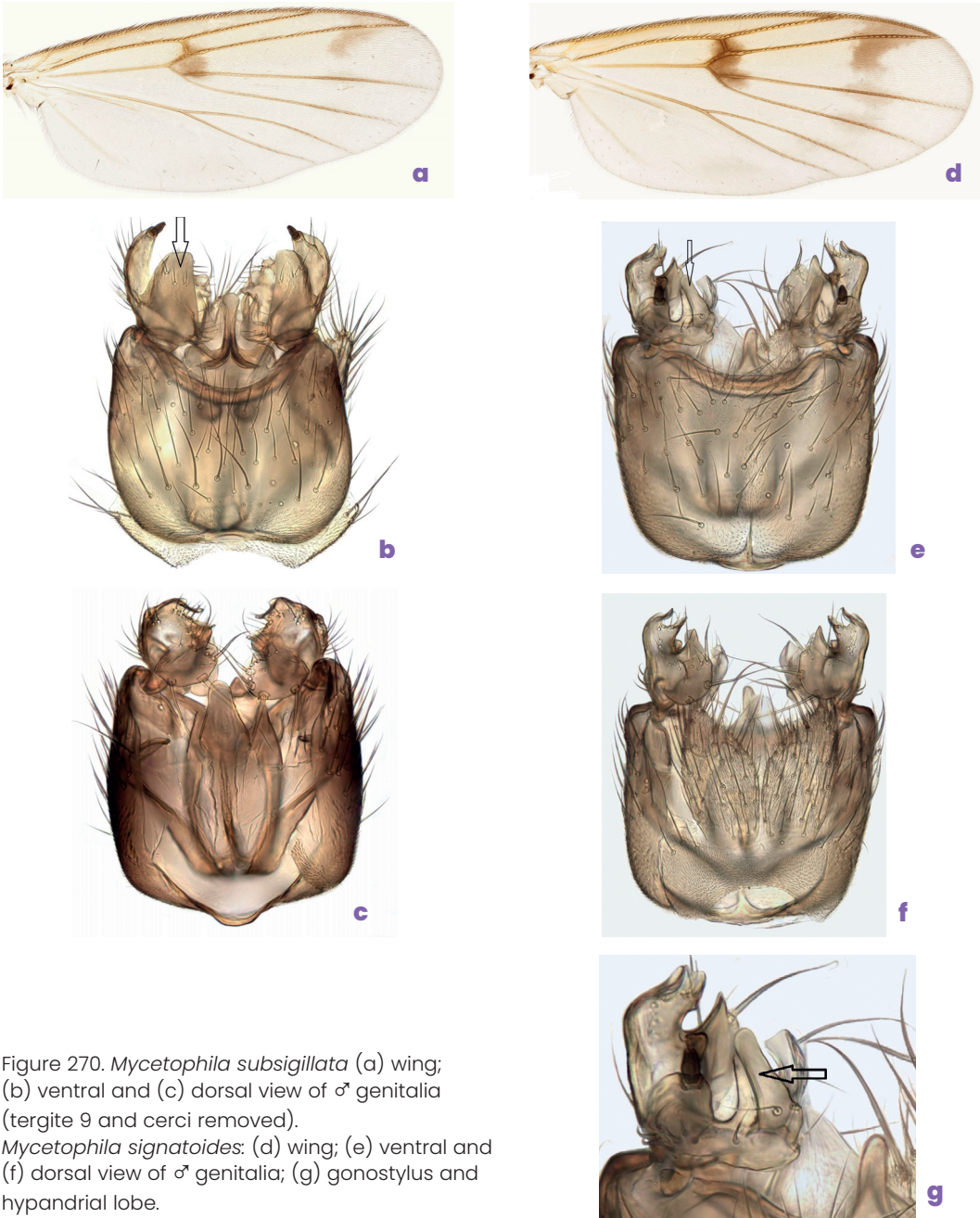


Figure 270. *Mycetophila subsigillata* (a) wing; (b) ventral and (c) dorsal view of σ genitalia (tergite 9 and cerci removed). *Mycetophila signatoides*: (d) wing; (e) ventral and (f) dorsal view of σ genitalia; (g) gonostylus and hypandrial lobe.

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KEY TO GROUP 9

1. Ventral lobe of gonostylus deeply bilobed with strong spines on outer more dorsal part. Mesonotum faintly shining yellow with three more or less fused dark stripes dorsally. Hind tibia with first row of anterior setulae mainly dark; second row dark on about apical half to two thirds; third row dark on less than apical half, other rows on about a quarter. Preapical wing band sinuous, fading across median fork 2
- Ventral lobe of gonostylus not bilobed (except in *M. fraterna*) and if with strong spines (*M. curviseta* and *M. hetschkoi*) these are situated on its dorsal surface medially. Mesonotum dull 3
2. Ventral lobe of gonostylus with only a cluster of short spinules (arrowed) subapically on its ventral part; its structure resembling *M. dziedickii* (GROUP 5), which has the ventral part of this lobe more elongate with stronger spines subapically *lunata* Meigen, 1804 (p. 289)

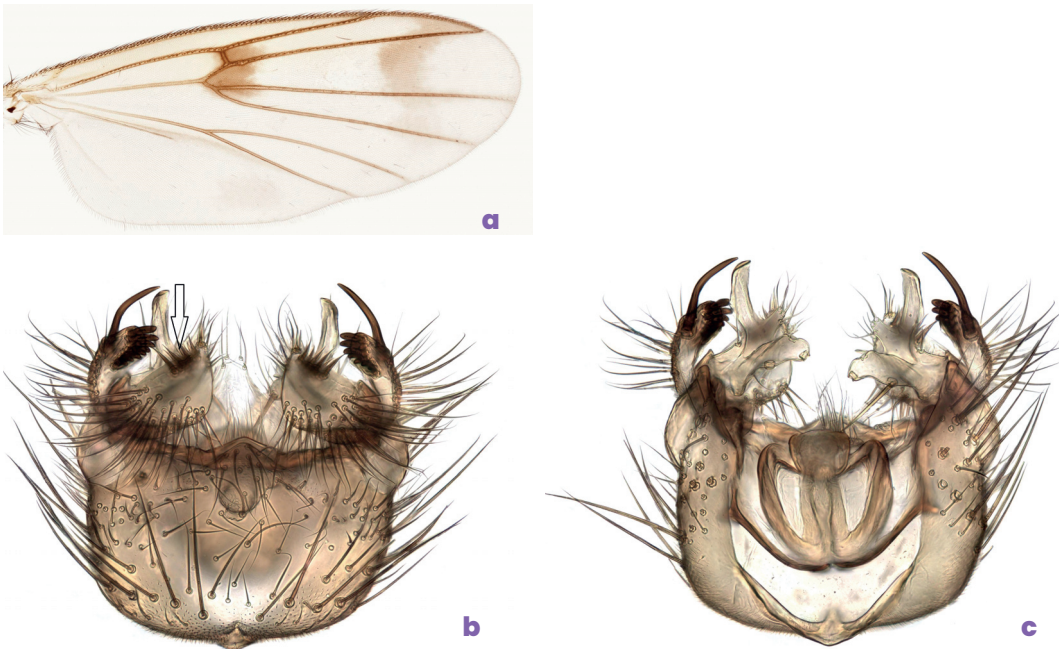


Figure 271. *Mycetophila lunata*: (a) wing; (b) ventral and (c) dorsal view of ♂ genitalia (tergite 9 and cerci removed).

- Ventral lobe of gonostylus with a pair of short spines (arrowed) medially in addition to the short spinules apically on its ventral part *sublunata* Zaitzev, 1998 (p. 296)

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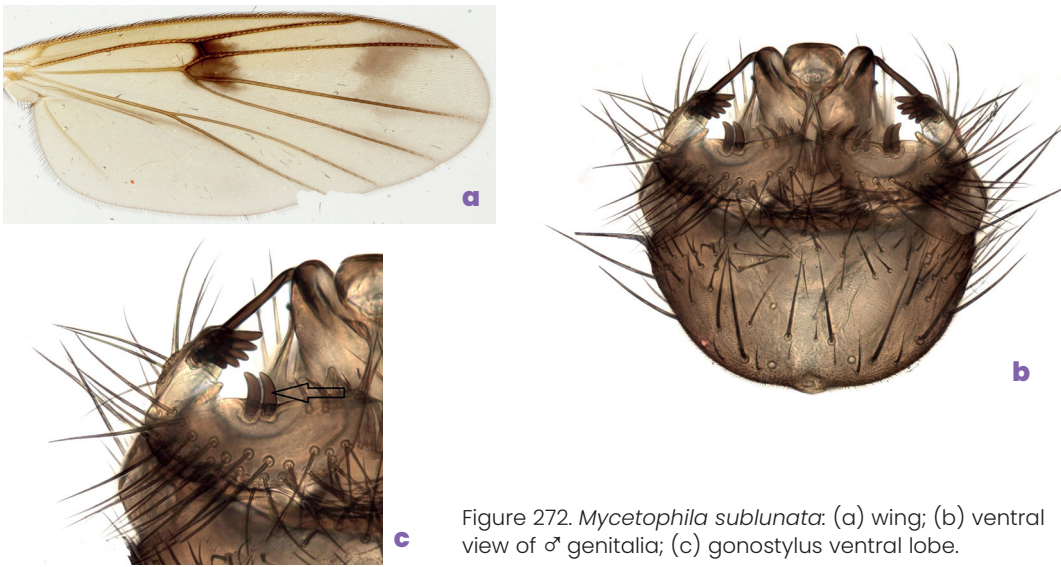


Figure 272. *Mycetophila sublunata*: (a) wing; (b) ventral view of ♂ genitalia; (c) gonostylus ventral lobe.

3. Ventral lobe of gonostylus deeply bilobed (arrowed). Mesonotum brownish yellow with light to dark brown stripes dorsally, more or less grey dusted and more or less fused behind. Preapical wing band usually ending just beyond M_1 , sometimes a faint shade over M_2 . Mid tibia with 2 strong ventral bristles. Hind tibia with lower rows of anterior setulae dark only on about apical quarter. Second flagellomere nearly twice as long as broad. Female cercus with apical segment broadly ovate *fraterna* Winnertz, 1864 (p. 285)
- Ventral lobe of gonostylus not bilobed 4

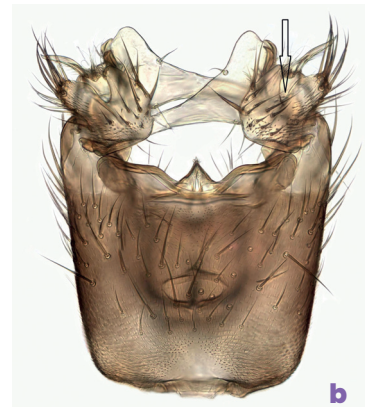


Figure 273. *Mycetophila fraterna*: (a) ♂; (b) ventral and (c) dorsal view of ♂ genitalia.



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4. Ventral lobe of gonostylus apically rounded with two or more strong spines on its dorsal surface medially. Hind tibia with first two rows of anterior setulae dark nearly to base, the succeeding rows dark on apical half or more 5
- Ventral lobe of gonostylus differently formed without any spines on its dorsal surface; if any spinose bristles are present these are on its apical margin 6
5. Ventral lobe of gonostylus with two apically curved spines (arrowed) on its dorsal surface. Mesonotum black with humeral area and area above the wing base yellow. Preapical wing band extending across median fork and a dark patch sometimes present behind posterior fork. Mid tibia with 2-3 ventral bristles (if 3 basal shorter)
..... *curviseta* Lundström, 1911 (p. 283)



Figure 274. *Mycetophila curviseta*: (a) ♂; (b) wing; (c) ventral and (d) dorsal view of ♂ genitalia.

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- Ventral lobe of gonostylus elongate, with group of spines (arrowed) near medial edge dorsally. Mesonotum usually yellow at sides, with more or less fused dark stripes dorsally [one male examined has thoracic coloration as *M. curviseta*]. Preapical wing band usually present and stopping short just before or at M_1 , sometimes a faint shade beyond. Mid tibia with 3 ventral bristles *hetschkoi* Landrock, 1918 (p. 286)

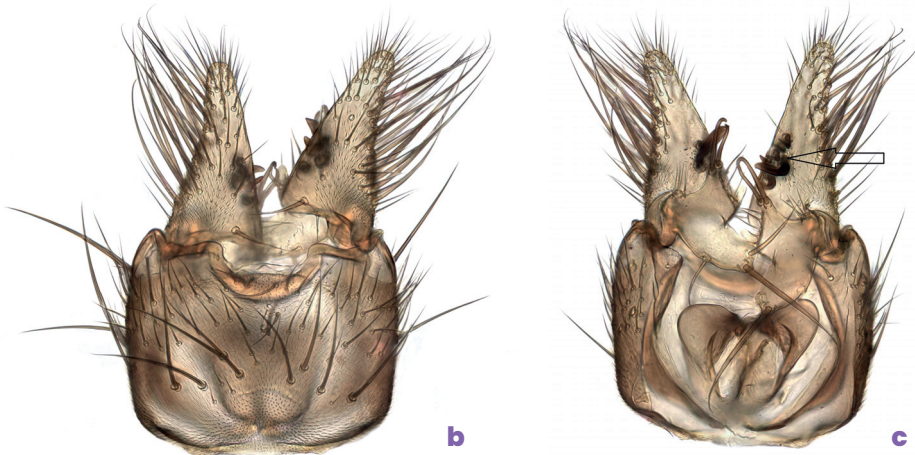


Figure 275. *Mycetophila hetschkoi*: (a) wing; (b) ventral and (c) dorsal view of ♂ genitalia (tergite 9 and cerci removed).

6. Ventral lobe of gonostylus with spinose bristles apically 7
- Ventral lobe of gonostylus with long and strong bristles laterally and subapically, but without any spinose bristles; tapered to a point apically on medial edge 8

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7. Ventral lobe of gonostylus narrowed apically with apical and subapical spinose bristles. Gonocoxites with a distinct hypandrial lobe (arrowed), which is basally narrow and expanded apically. Mesonotum with distinct dark brown (grey-dusted) stripes that are clearly separate throughout. Wing with preapical band sinuous, extending strongly across median fork and fading towards posterior fork (occasionally only strong to M_1). Mid tibia with 2-3 ventral bristles. Female cercus with apical segment ovate in lateral view *spectabilis* Winnertz, 1864 (p. 294)
- Ventral lobe of gonostylus broad, with a row of spinose bristles (arrowed) on its apical margin. Gonocoxites without a hypandrial lobe. Mesonotum mainly yellow with three light to dark brown stripes dorsally. Preapical wing marking distinct to middle of cell r_5 , extending faintly across M_1 and sometimes a separate patch over M_2 . Mid tibia with 3 strong ventral bristles. Hind tibia with third row of anterior setulae dark on less than apical half, succeeding rows on about apical quarter. Female cercus with apical segment elongate *finlandica* Edwards, 1913 (p. 284)

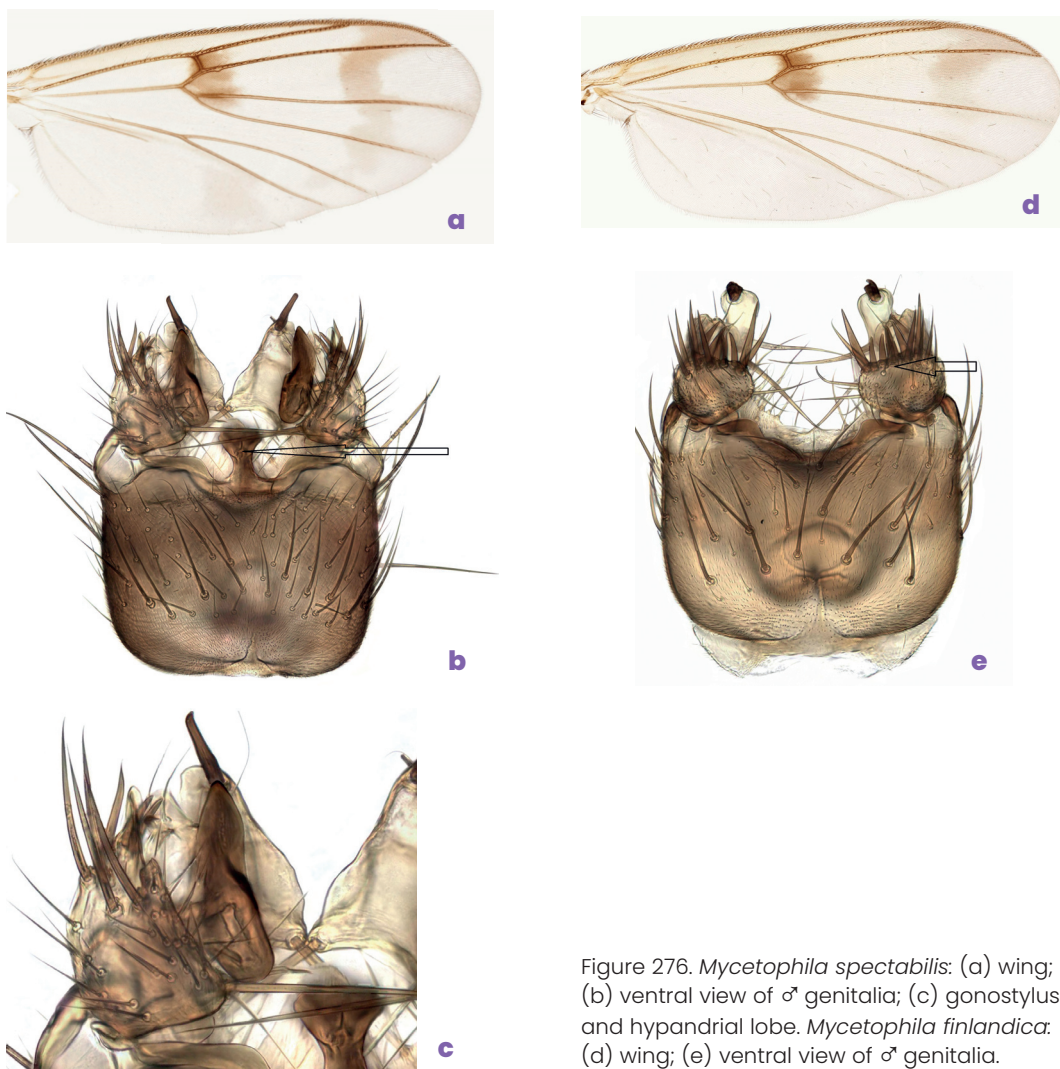
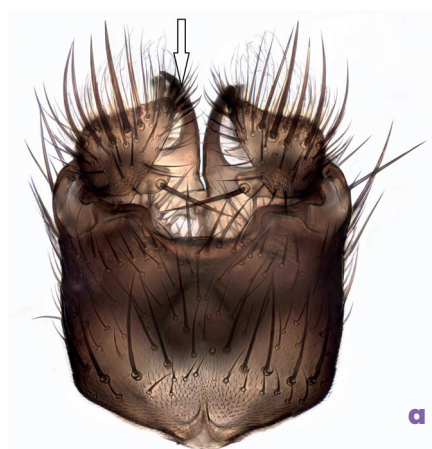


Figure 276. *Mycetophila spectabilis*: (a) wing; (b) ventral view of σ genitalia; (c) gonostylus and hypandrial lobe. *Mycetophila finlandica*: (d) wing; (e) ventral view of σ genitalia.

8. Dorsal lobe of gonostylus with medial branch curved and tapered to a pointed tip (arrowed). Mesonotum usually yellow at sides, with more or less fused dark stripes dorsally. Preapical wing band sinuous, progressively fading across median fork. Mid tibia with 3 ventral bristles. Hind tibia with first two rows of anterior setulae mainly dark, the third row sometimes dark on about apical half, but succeeding rows dark on distinctly less than apical half
 *lastovkai* Caspers, 1984 (p. 288)



- Dorsal lobe of gonostylus with medial branch thick and with a blunt tip (arrowed in both views). Mesonotum usually more or less broadly yellow at sides with three more or less fused dark stripes dorsally, sometimes more extensively dark with only humeral areas yellow (as in *M. curviseta* and in habitus figure). Preapical wing band extending across median fork and a dark patch usually present on membrane behind posterior fork. Mid tibia with 2-3 ventral bristles. Hind tibia with all rows of anterior setulae dark at least on apical two fifths. Female cercus with apical segment elongate oval
 *marginata* Winnertz, 1864 (p. 289)

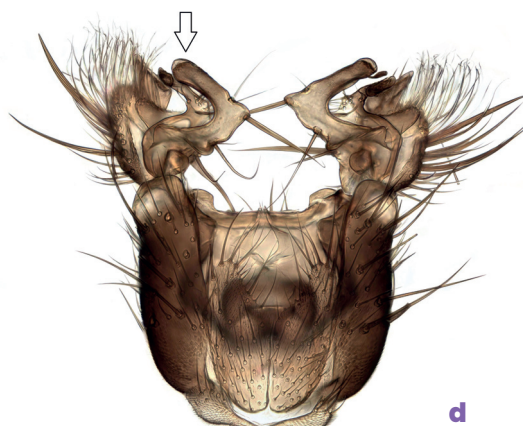


Figure 277. *Mycetophila lastovkai*. (a) ventral view of ♂ genitalia. *Mycetophila marginata*. (b) ♂; (c) ventral and (d) dorsal view of ♂ genitalia. (See Figure 278 for wings.)

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Figure 278. Wing of: (a) *Mycetophila lastovkai*; (b) *Mycetophila marginata*.

Species notes

Mycetophila abbreviata Landrock, 1914

Distribution. Restricted in Britain to the Scottish Highlands, but widespread and present in most of the regions within its range; there appears to have been a recent increase (24 hectads, 12 with post-2000 records) (map, Fig. 6a). Palearctic, widespread in Europe.

Habitat. Broad-leaved and mixed woodland.

Biology. Unknown.

Mycetophila abiecta (Laštovka, 1963)

Distribution. Frequent in the south, north to Yorks and a few Scottish records; in Ireland widespread in the south. Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. **No British records. Other records:** reared from moist fallen moss-covered trunk of *Salix caprea* without fungal fruiting bodies (Jakovlev 2011, Finland). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Mycetophila adumbrata Mik, 1884

Distribution. Frequent and widespread throughout Britain, with a recent increase in records; widespread in Ireland. Widespread in Europe.

Habitat. Woodland.

Biology. It develops in myxomycetes. **No British records. Other records:** first recorded from an unnamed myxomycete species (Krivosheina *et al.* 1986); *Lycogala epidendrum*, in dry stages of aethalia in which they pupate (Ševčík 2006, Czech Republic; Jakovlev 2011, Finland). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Mycetophila alea Laffoon, 1965

Distribution. Common throughout Britain and Ireland, also in Isle of Man and Jersey. Holarctic, widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. It develops in several genera of boletes and terrestrial agarics. **British records:** reared many times from *Russula nigricans*, tough cocoons bearing a neat papery cap in front, embedded in fungus (Edwards 1925, Madwar 1937, J. Webb, P. Chandler, R. Fortey, Fortey and Chandler 2021). **Other records:** *Amanita*, *Boletus*, *Choiromyces venosus*,

Clitocybe, *Gymnopus*, *Gyroporus*, *Hebeloma*, *Hygrophorus*, *Lactarius turpis*, *L. resimus*, *Lactifluus piperatus*, *Russula adusta*, *R. delica*, *R. nigricans*, *Suillus* (Dely-Draskovits 1974, Hackman and Meinander 1979, Laštovka 1970, Mikołaczyk 1967, Plassmann 1971, Ševčík 2006 and Russian records cited by Jakovlev 1994).

***Mycetophila autumnalis* Lundström, 1909**

Distribution. Frequent in S England, becoming more scattered further north, apparently becoming more frequent recently but with only two Scottish records (Grantown, 2002; Rannoch, 2015); two records from N Ireland (Glenarm, Co Antrim, 2006, K. Alexander; Belvoir Park Forest, 2019, R. Mitchell). Palearctic, widespread in Europe.

Habitat. Mainly recorded from ancient woodland.

Biology. **British records:** *Postia tephroleuca* (R. Fortey; Fortey and Chandler 2021). **Other records:** reared from mycelium under bark of a rotting spruce log (Zaitzev 2003) and from sterile fungal tissue under loose bark of a spruce log (Jakovlev 2011, Finland).

***Mycetophila bialorussica* Dziedzicki, 1884**

Distribution. Mainly found in the Scottish Highlands (20 hectads), where it is present in several regions, with one record from Wales (Allt yr Esgair Wood, 2011) and an old record from Cornwall (Lelant, 1912). Palearctic, widespread in Europe.

Habitat. Broad-leaved woodland.

Biology. It develops in bracket fungi. **No British records.** **Other records:** *Lentinus brumalis* (Zaitzev 2003, Russia; Ševčík 2010, Slovakia, photograph of larvae in fungus) and *Picipes melanopus* (Jakovlev 2011, Finland).

***Mycetophila blanda* Winnertz, 1864**

Distribution. Widespread and frequent throughout Britain, and common in Scotland; widespread in Ireland. Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. It develops mainly in *Lactarius* (9 species), with a few records from one species each of *Russula*, *Hygrophoropsis* and *Lentinus*, all terrestrial except the last. Ševčík (2010) noted that it was oligophagous in association with the *Lactarius deliciosus* group and that records from *Lentinus* and *Russula* need confirmation. **British records:** *Lactarius deliciosus*, cocoons within decaying remains of fungus (Edwards 1925). **Other records:** *Hygrophoropsis aurantiaca*, *Lactarius blennius*, *L. deterrimus*, *L. deliciosus*, *L. glyciosmus*, *L. helvus*, *L. quieticolor*, *L. rufus*, *L. salmonicolor*, *L. sanguifluus*, *L. semisanguifluus*, *Lentinus tigrinus*, *Russula delica* (Dely-Draskovits 1974, Eisfelder 1955 and 1956, Hackman and Meinander 1979, Kurina 1998, Laštovka 1970, Luterek 1969, Ribeiro 1990, Rimšaite 2000, Ševčík 2006 and 2010, and Russian records cited by Jakovlev 1994).

***Mycetophila bohémica* (Laštovka, 1963)**

Distribution. Locally frequent in the Scottish Highlands (33 hectads), with two records from Cumbria (Great Wood, 1991; Thorneythwaite Fell, 2017) and one from Wales (Pencelli Mire, 1997). Palearctic, widespread in Europe.

Habitat. Broad-leaved and mixed woodland.

Biology. No British records. **Other records:** reared from under bark of a decayed spruce log bearing *Penttilamyces romellii* (Jakovlev 2011, Finland).

***Mycetophila britannica* Laštovka & Kidd, 1975**

Distribution. Very common throughout Britain, including the Western Isles (Barra), and Ireland, also in Scilly Isles, Isle of Man and Jersey. Widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. All types of wooded and open habitats.

Biology. It develops in several genera of terrestrial and saproxylic agarics, and has also been reared from the soft polypore *Cerioporus squamosus*. **British records:** *Armillaria mellea*, *Cerioporus squamosus*, *Hebeloma crustuliniforme*, *Russula nigricans* (Laštovka and Kidd 1975), *Clitocybe phaeophthalma*, *Entoloma clypeatum*, *Russula fellea* (Chandler 1993b), *Hypholoma fasciculare*, *Russula emetica* (P. Chandler), *Armillaria*, *Cerioporus squamosus*, *Clitocybe nebularis*, *Cortinarius basiroseus*, *Lactarius acerrimus*, *L. turpis*, *Pholiota aurivella* (J. Webb), *Amanita citrina*, *Clitocybe nebularis*, *Cortinarius torvus*, *Megacollybia platyphylla*, *Pleurotus ostreatus*, *Russula fellea*, *R. nobilis*, *R. ochroleuca*, *R. subfoetens*, *R. velenovskyi* (R. Fortey, Fortey and Chandler 2021). **Other records:** *Lactarius resimus* (Jakovlev 1994, his rearing from Karelia).

***Mycetophila caudata* Staeger, 1840**

Distribution. Formerly regarded as a Scottish only species in Britain, with most records from the Spey and Findhorn valleys with outliers to Loch Loy, Migdale Wood and Glen Lui (16 Scottish hectads, 8 of them post-2000); since 1997 it has been recorded in SE England, from Suffolk to Hants, with records now from 32 hectads (all with post-2000 records). It is presumably a recent arrival in England but without precise knowledge of its ecological requirements it is difficult to assess how its status is changing (map, Fig. 7b). Holarctic, widespread in Europe.

Habitat. It was considered to be restricted to Scottish woodlands, including Caledonian pine forest until 1997, but has since been found in a variety of woodland sites in S England.

Biology. Unknown.

***Mycetophila cingulum* Meigen, 1830**

Distribution. Frequent throughout Britain; widespread in Ireland, also in Isle of Man and Jersey. Holarctic, widespread in Europe.

Habitat. Woodland and hedges.

Biology. An oligophagous species, thought until recently to be confined to the soft polypore *Cerioporus squamosus*; adults had been observed assembling on a colony of *Grifola frondosa* (Chandler 1993b) and Ševčík (2006) confirmed the association by rearing it from that fungus. Edwards (1925) noted that it had a slight cocoon, formed underground.

British records: *Cerioporus squamosus* (Buxton 1960, Chandler 1993b, Edwards 1925, Madwar 1937, Trifourkis 1977), *Grifola frondosa* (J. Webb, A.M. Hutson). **Other records:** *C. squamosus* (Eisfelder 1955, 1956), *C. squamosus* and *Grifola frondosa* (Ševčík 2006, 2010).

***Mycetophila confluens* Dziedzicki, 1884**

Distribution. Common in Scotland (63 hectads), with more scattered records in England (13 hectads) and a record from Wales (Pont Rhys Powell, Gwent, 19.x.1981, I. McLean). Chandler (2018b) recorded it from Ireland (Breen Wood, Co Antrim, viii-x.2017, A. Mantell). Palearctic, widespread in Europe.

Habitat. Woodland and heathland.

Biology. It develops in terrestrial fungi. **No British records. Other records:** *Suillus granulatus*, *S. variegatus* (Kurina 1991, Estonia), *Lactarius rufus*, *Xerocomus subtomentosus* (Russian records cited by Jakovlev 1994).

***Mycetophila confusa* Dziedzicki, 1884**

Distribution. Restricted to wetland sites in East Anglia, where it is locally common (14 hectads, 4 with post-2000 records). Palearctic, widespread in Europe.

Habitat. Carr woodland and fens.

Biology. Unknown.

***Mycetophila curviseta* Lundström, 1911**

Distribution. Common throughout Britain and Ireland, also in Isle of Man and Jersey. Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. Surprisingly not yet recorded.

***Mycetophila czizekii* Landrock, 1911**

Distribution. Known in Britain only from 1980s records at three localities in two hectads of N Yorks (Birkbeck Wood, 27.vi.1981, I. McLean; Castle Bolton, 3.x.1985, M. Pugh; Rake Beck, 4.x.1985, I. McLean) and one in Durham (Castle Eden Dene, 14.ix.1981, J.H. Cole). Widespread in Europe.

Habitat. Sites in Britain are damp broad-leaved woodland.

Biology. **No British records. Other records:** reared from a terrestrial agaric *Lactarius helvus* (Eisfelder 1955).

***Mycetophila deflexa* Chandler, 2001**

Distribution. Scattered records in S England and East Anglia. It was first recorded in 1984 at Chobham Common, Surrey, and all other records are from 1990 onwards (36 hectads, all but one with post-2000 records). Widespread in Europe, also in N Africa.

Habitat. Damp broad-leaved woodland.

Biology. Unknown

***Mycetophila dentata* Lundström, 1913**

Distribution. Frequent throughout Britain, commonest in the south; widespread in Ireland. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. There is a record from the terrestrial bolete *Leccinum scabrum*, but it otherwise develops in saproxylic fungi. **British records:** *Picipes badius* (P. Chandler), *Cerioporus squamosus* (R. Fortey; Fortey and Chandler 2021), *Daedaleopsis confragosa* (J. Webb). **Other records:** *Leccinum scabrum*, *Mycena* sp., *Fomitopsis betulina* (Jakovlev 1994, his own rearings in Karelia), *Pleurotus pulmonarius* (Ševčík 2006, Czech Republic), *Picipes badius* (Ševčík 2010).

***Mycetophila dziedickii* Chandler, 1977**

Distribution. Scattered in the south and midlands of England (20 hectads, only 7 post-2000); a few records from the Scottish Highlands (4 hectads). Widespread in Europe.

Habitat. Woodland.

Biology. **No British records.** **Other records:** reared from under loose birch bark bearing the resupinate fruiting bodies of *Baltazaria* (as *Scytinostroma*) *galactina* (Jakovlev 2011, Finland).

***Mycetophila edwardsi* Lundström, 1913**

Distribution. Common throughout Britain and widespread in Ireland, also in Isle of Man. Widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Woodland.

Biology. Surprisingly not yet recorded.

***Mycetophila eppingensis* Chandler, 2001**

Distribution. First recorded when it was discovered at Epping Forest in 1998, but it was soon also seen from sites in Hants and Oxon in 1999 (Chandler 2001a) and found at further localities scattered across S England and East Anglia (44 hectads, all but 2 with post-2000 records). In 2012 it was found at a site in Scotland (Cleghorn Glen, Lanarkshire), in 2017 at Thorneythwaite Fell, Cumbria and in 2020 at Trawscoed in N Wales. Chandler (2018b) recorded it from N Ireland (Breen Wood, Co Antrim, vi–viii.2017, A. Mantell). Widespread in W and N Europe.

Habitat. Ancient woodland and carr.

Biology. Unknown.

***Mycetophila evanida* Laštovka, 1972**

Distribution. Common in the Scottish Highlands, with a few records from Cumbria and the Pennines in England (6 hectads), and Trawscoed, N Wales in 2017 and 2018 (A. & J. Graham). Palearctic, widespread in Europe.

Habitat. Broad-leaved and coniferous woodland.

Biology. Develops in terrestrial agarics, with most records from *Lactarius* and a few from other genera. **No British records.** **Other records:** *Lactarius rufus* (Laštovka 1972b, Czech Republic), *L. resimus*, *Russula* sp., *Tubaria confragosa* (Jakovlev 1994, his own rearings in Karelia), *Lactarius deterrimus*, *L. fulvissimus*, *Hebeloma sacchariolens*, *Russula luteotacta* (Ševčík 2006, 2010).

***Mycetophila finlandica* Edwards, 1913**

Distribution. Widespread in Britain; common in Scotland, with more scattered records further south; widespread in the southern half of Ireland (11 hectads). Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. It has been reared several times from saproxylic agarics of the genus *Tricholomopsis*.

British records: *Tricholomopsis rutilans* (Buxton 1960). **Other records:** *T. rutilans* (Hackman and Meinander 1979, Kurina 1991, Laštovka 1970 and Jakovlev 1994, his own rearing in Karelia), *T. decora* (Ševčík 2006, 2010). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Mycetophila forcipata* Lundström, 1913**

Distribution. Common throughout Britain; widespread near the coast in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland with birch present.

Biology. Develops principally in *Fomitopsis betulina*, in which the larvae feed at the base of the tubes, not on the flesh of the cap; it pupates in soil. **British records:** *Cerioporus squamosus* (Madwar 1937), *Fomitopsis betulina* (Edwards 1925, Chandler 1977b). **Other records:** *F. betulina* (Ševčík 2006, 2010).

***Mycetophila formosa* Lundström, 1911**

Distribution. Common throughout Britain; widespread in Ireland. Palaearctic, widespread in Europe, also in N Africa.

Habitat. All types of woodland.

Biology. Develops in wood-encrusting fungi. **British records:** *Phlebia radiata* (Buxton 1960, Edwards 1925, Fortey and Chandler 2021), *Byssomerulius corium* (Fortey and Chandler 2021). **Other records:** *Phlebia radiata* on burned birch trunk, decayed spruce log bearing *Trechispora hymenocystis* (Jakovlev 2011, Finland).

***Mycetophila fraterna* Winnertz, 1864**

Distribution. Common throughout Britain; widespread in Ireland, also in Scilly Isles (Tresco, 6.x.1970, A.M. Hutson), Isle of Man and Jersey. Widespread in Europe.

Habitat. Woodland.

Biology. **British records:** the wood-encrusting fungus *Physisporinus vitreus* (Chandler 1993b). **Other records:** Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Mycetophila freyii* Lundström, 1909**

Distribution. Scattered records in S England (17 hectads), with most from ancient forest areas and three widely separated Scottish localities, including three records from Spey Bridge at Grantown (1911, 1984, 1993), also in Jersey. There was some taxonomic difficulty in separation from *M. stolidus*, but *M. freyii* appears the rarer. Widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Mycetophila fungorum* (De Geer, 1776)**

Distribution. Very common throughout Britain and Ireland, also in Isle of Man and Jersey. Palaeartic, widespread in Europe.

Habitat. All types of wooded habitats.

Biology. Polyphagous, developing in boletes and in many genera of terrestrial and saproxylic agarics, *Cerioporus* and *Peziza*, but older records may include *M. perpallida*, this also applying to records from *Phallus impudicus* (Plassmann 1971), *Cerioporus squamosus* (Buxton 1960), *Cantharellus cibarius* (Hackman and Meinander 1979), *Clavaria* and *Exidia* (Chandler 1993b). Confirmed records are as follows. **British records:** *Armillaria mellea*, *Chamaemyces fracidus*, *Entoloma clypeatum*, *Inocybe godeyi*, *Russula alutacea*, *R. claroflava*, *R. pectinata*, *R. vesca*, *Suillus bovinus* (Chandler 1993b), *Cortinarius* sp., *Russula sanguinea* (P. Chandler), *Agrocybe rivulosa*, *Amanita muscaria*, *A. rubescens*, *A. vaginata*, *Cerioporus squamosus*, *Hygrophorus personii*, *Limacellopsis guttata*, *Pholiota aurivella*, *Pluteus cervinus*, *Pseudosperma rimosum*, *Russula ochroleuca*, *R. parazurea*, *R. cf. sanguinea*, *Suillus grevillei*, *Xerocomellus porosporus* (J. Webb), *Lepista nuda* (D.A. Smith), *Rhodocollybia butyracea* (J. Webb, R. Fortey), *Armillaria mellea*, *Boletus edulis*, *Megacollybia platyphylla*, *Mucidula mucida* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Agrocybe*, *Chlorophyllum*, *Collybia*, *Cortinarius*, *Flammulina*, *Hebeloma*, *Kuehneromyces*, *Lactarius*, *Leccinum*, *Lepiota*, *Lyophyllum*, *Macrolepiota*, *Megacollybia*, *Melanoleuca*, *Neolentinus lepideus*, *Omphalina pyxidata*, *Panaeolus*, *Paxillus*, *Peziza* sp., *Pleurotus ostreatus*, *Lentinus substrictus*, *Psathyrella*, *Russula*, *Stropharia*, *Tricholoma*, *Tricholomopsis*, *Tubaria*, *Tylopilus felleus* (Ševčík 2006, 2010; Jakovlev 1994, his own rearings in Karelia).

***Mycetophila gibbula* Edwards, 1925**

Distribution. Widespread in Britain, but with an apparently disjunct distribution with records concentrated in S England and the Scottish Highlands; two records from the west of Ireland (Belleek Wood, Co Mayo, 2000; Slieve Carran, Co Clare, 2018). Palaeartic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Mycetophila hetschkoi* Landrock, 1918**

Distribution. Particularly common in SW England and Wales and apparently increasing recently within this range, with eastwards extensions to Hants and Sussex, the Midlands and N Yorks; widespread but uncommon in Scotland (6 hectads); widespread in the central part of Ireland. Palaeartic, widespread in Europe.

Habitat. Woodland.

Biology. Oligophagous in Gomphales (*Clavariadelphus*, *Ramaria*) and Thelephorales (*Bankera*). **No British records.** **Other records:** *Phellodon fuligineoalbus*, *Clavariadelphus truncatus*, *Ramaria aurea* (Jakovlev 1994, 2011, his own rearings in Karelia), *R. formosa* (Dely-Draskovits 1974, Hungary), *R. flavescens* (Ševčík 2010, Slovakia).

***Mycetophila hyrcania* Laštovka & Matile, 1969**

Distribution. The first British record was in 2014 (Chalkhills Farm, Bucks, M. Townsend) (Chandler 2016) and it has since been found at the Warburg Reserve, Oxon (2016, I. Perry) (Chandler 2018a), three sites in Cambs (Chippenham Fen, 24.x.2018; Devil's Ditch, 30.iv.2019; Fulbourn Fen, 3.vii, 13.vii and 16.viii.2019; all I. Perry) and Shoulder of Mutton, Hants (20.iv.2019, M. Mitchell). Widespread in C and S Europe.

Habitat. British sites are mostly woodland and fen on chalk.

Biology. Unknown.

***Mycetophila ichneumonea* Say, 1823**

Distribution. Common throughout Britain and Ireland, also in Isle of Man and Jersey. Holarctic, widespread in Europe.

Habitat. All types of wooded habitats.

Biology. Polyphagous in many genera of terrestrial and saproxylic agarics (Agaricales and Russulales). Jürgenstein *et al.* (2015) found most hosts in Estonia to be *Cortinarius* and *Lactarius* spp. **British records:** *Gymnopilus junonius*, *Lactarius tabidus*, *Mycena pelianthina*, *Pleurotus* sp. (Chandler 1993b, Laštovka and Kidd 1975, Trifourkis 1977). **Other records:** *Armillaria*, *Amanita*, *Clitocybe*, *Gymnopus*, *Cortinarius*, *Entoloma*, *Hebeloma*, *Hygrophorus*, *Inocybe*, *Kuehneromyces*, *Lactarius*, *Lepista*, *Megacollobia*, *Pholiota*, *Rhodocollybia*, *Russula*, *Stropharia*, *Tricholoma*, *Tricholomopsis*, *Tubaria*, *Xeromphalina* (Hackman and Meinander 1979, Laštovka 1970, Rimšaite 2000, Ševčík 2006, Jakovlev 1994 and 2011, Jürgenstein *et al.* 2015). Dedy (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Mycetophila idonea* Laštovka, 1972**

Distribution. A male collected in a Malaise trap at Gusach, Loch Arkaig (5.vii–18.viii.2018, I. Strachan) was identified as *M. idonea* (Strachan 2020), but this is now thought to be a misidentification (Vladimir Blagoderov *pers. comm.*). Palearctic, widespread in Europe.

Habitat. Woodland. The Loch Arkaig site is Caledonian pine forest.

Biology. **No British records.** **Other records:** polyphagous in Agaricales and Russulales, and a record from *Hemileccinum impolitum* (Jakovlev 1994); *Amanita citrina* (Jürgenstein *et al.* 2015).

***Mycetophila immaculata* (Dziedzicki, 1884)**

Distribution. Very local with most records (17 hectads) near the south and west coasts of England and Wales, with four records in Scotland (River Tay at Caputh and Methven Wood, both 1992; Bognacruie in Abernethy Forest, 1999; Canon Dam, 2018) and two in N Ireland (Breen Wood, Co Antrim, viii–x.2017, A. Mantell; Clandeboye Estate, Co Down, 6.x.2019, R. Mitchell). Widespread in C and N Europe.

Habitat. Ancient broad-leaved woodland.

Biology. Unknown.

***Mycetophila lamellata* Lundström, 1911**

Distribution. Restricted to S England and Wales, with most records south of the Thames, reaching north to Shropshire (Haughmont Hill, 2015) and Suffolk (Brandon Country Park, 2012) in England, with only a Welsh record (Eisingrug, 1995) further north. However, locally common within this range (map, Fig. 8a). Widespread in W, C and S Europe, not known from the Nordic region.

Habitat. Ancient broad-leaved woodland.

Biology. British records: from a resupinate wood-encrusting poroid *Mycoacia gilvescens* (R. Fortey; Fortey and Chandler 2021).

***Mycetophila lapponica* Lundström, 1906**

Note. British specimens agree well with the figures by Lundström (1906). Zaitzev's (2003) figures are of a different species, closer to *M. uliginosa*; he thought *M. longiseta* Ostroverkhova, 1979 might be conspecific with his concept of *lapponica*.

Distribution. In Britain only known from Scotland (5 hectads), where it has a restricted distribution, with records from the Rannoch area (1987, 1990) and Fealar Gorge (1999) in Perthshire, Beinn Eighe in W Ross (1984) and Tokavaig Wood in Skye (1991). Widespread in C and N Europe.

Habitat. Most records are from Caledonian pine forest, but also broad-leaved woodland on Skye.

Biology. Unknown.

***Mycetophila lastovkai* Caspers, 1984**

Distribution. Widespread in SW England and Wales, extending east to Middlesex and also with recent records from East Anglia (Brandon Country Park, Suffolk 2010) and Kent (Ashenbank Wood and King's Wood, 2016), and a surprising widely separated Scottish record (Glen Artney, 28.vi.2019, A. Cunningham). A recent increase in records is apparent (56 hectads, 51 post-2000). In Britain this species was first recognised (Chandler 1988) only following its description from Germany in 1984; a Cornwall record in 1983 was then the earliest known. An earlier Suffolk record (Butley Thicks, 1910) and one from Lyndhurst, Hants (1911) have since come to light. Widespread in Europe.

Habitat. Ancient broad-leaved woodland.

Biology. Unknown.

***Mycetophila lubomirskii* Dziedzicki, 1884**

Distribution. Scattered in SE England (17 hectads). It was first recognised in Britain from Felbrigg Great Wood, Norfolk in 1975 and only one site (Pittance Park, Sherwood Forest, 2008) was known further north until it was found at three sites in Scotland (Linn of Tummel, 2013 and 2014; Loch Insh shore, 2016; Sauchie Craig, 2019, Chandler 2020). Widespread in W and N Europe.

Habitat. Broad-leaved woodland.

Biology. No British records. Other records: reared from rotten spruce logs bearing the fungi *Butyrea luteoalba* and *Asterodon ferruginosus* (Jakovlev 2011, Finland).

***Mycetophila luctuosa* Meigen, 1830**

Distribution. Common throughout Britain and Ireland, also in Isle of Man and Jersey. Holarctic, widespread in Europe.

Habitat. All types of wooded habitats.

Biology. Polyphagous in many genera of terrestrial and saproxylic agarics, and there are also records from polypores (*Cerioporus*, *Meripilus*, *Picipes*, *Trametes*) and wood-encrusting fungi (*Chondrostereum*, *Kretzschmaria*, *Sebacina*). **British records:** *Chondrostereum purpureum*, *Kretzschmaria deusta*, *Russula ochroleuca* (Buxton 1960, Trifourkis 1977), *Lactifluus piperatus*, *L. vellereus* (Trifourkis 1977), *Lactarius rufus*, *Sebacina incrustans* (Chandler 1993b), *Paxillus involutus* (Edwards 1925, Madwar 1937), *Cerioporus squamosus* (J. Webb), *Fomitopsis betulina* (Chandler 1978b), *Clitocybe phaeophthalma* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Amanita caesarea*, *A. gemmata*, *A. verna*, *Armillaria mellea*, *Cortinarius caperatus*, *Clitocybe infundibuliformis*, *Lactarius deliciosus*, *L. helvus*, *L. pilatii*, *L. tabidus*, *L. torminosus*, *L. trivialis*, *Lactifluus vellereus*, *Lentinus tigrinus*, *Meripilus giganteus*, *Neolentinus lepideus*, *Picipes badius*, *Pleurotus cornucopiae*, *P. pulmonarius*, *Russula aeruginea*, *R. aurora*, *R. cyanoxantha*, *R. densifolia*, *R. sanguinea* (Barendrecht 1938, Canzanelli 1941, Hackman and Meinander 1979, Kurina 1991 and 1998, Laštovka 1970, Plassmann 1971, Ribeiro 1990, Ševčík 2006 and 2010, Russian records cited by Jakovlev 1994, Jakovlev 2011), *Trametes versicolor* (Plassmann 1971).

***Mycetophila lunata* Meigen, 1804**

Distribution. Common in England and Wales, though in N England all records are east of the Pennines. There are only two Scottish records, from Newtown St Boswell's, Roxburghshire (2009) and Migdale Wood, Sutherland, both eastern. Palearctic, widespread in Europe.

Habitat. Woodland and carr.

Biology. **British records:** *Coniophora puteana* (Chandler 1977b, 1993b). **Other records:** *Hygrophoropsis aurantiaca* (Kurina 1998, Estonia).

***Mycetophila magnicauda* Strobl, 1895**

Distribution. Frequent in the north and west of Britain, common in Scotland and Wales; English records are restricted to the south-west, the N Midlands and Cumbria; widespread in Ireland, also in Isle of Man (map, Fig. 5a). Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Mycetophila marginata* Winnertz, 1864**

Distribution. Common throughout Britain and Ireland, also in Isle of Man and Jersey. Widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. Polyphagous in polypores, wood-encrusting fungi and saproxylic agarics, with some records also from terrestrial agarics. **British records:** *Fistulina hepatica*, *Schizopora*

paradoxa, *Stereum* sp., *Trametes versicolor* (Edwards 1925), *Paxillus involutus* (Madwar 1937), *Flammulina velutipes* (Buxton 1960, J. Webb), *Xylaria hypoxylon* (Buxton 1960), *Fistulina hepatica*, *Hebeloma crustuliniforme*, *Pleurotus ostreatus*, *Russula vesca* (Chandler 1993b), *Bjerkandera adusta* (J. Bowden), *Phallus* (Chandler 1978b). **Other records:** *Bjerkandera adusta* (Jakovlev 2011), *Pleurocybella porrigens* (Ševčík 2006, 2010), *Tricholoma portentosum* (Canzanelli 1941), *Armillaria*, *Pholiota* (Eisfelder 1955). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Mycetophila mitis* (Johannsen, 1912)**

Distribution. Widespread in England, with most records from the south and east, only east of the Pennines in N England, and with only two records in Scotland (Logie, before 1913; Divach Falls, Glen Coiltie, 1997). Holarctic, widespread in Europe.

Habitat. Woodland and carr.

Biology. Unknown.

***Mycetophila mohilevensis* Dziedzicki, 1884**

Distribution. Only known in Britain on six records from the Scottish Highlands (Dalnapot, 14.vi.1962; Camusurich Wood, 2.vii.1979; Dinnet Oakwood NNR, 23.x.1993; Dundreggan, 9.vii.2013; Boat of Garten, 2.vi.2014; Conon Dam, 29.viii.2018). Widespread in C and N Europe.

Habitat. Damp broad-leaved woodland.

Biology. **No British records.** **Other records:** the soft polypore *Tyromyces chioneus* (Ševčík 2006, 2010, Slovakia).

***Mycetophila morosa* Winnertz, 1864**

Distribution. Recorded from 8 sites in 7 hectads of the Scottish Highlands over the period 1903 to 2004. These include the Spey, Findhorn and Dee valleys, as well as E Ross and Loch Loy, Nairn. Most recent are Boat of Garten (23.vi.2002) and Dulicht Wood, Grantown (12.ix.2004). Holarctic, widespread in Europe.

Habitat. The Scottish records are probably from both broad-leaved and mixed woodland.

Biology. **No British records.** **Other records:** *Trametes versicolor* (Ševčík 2006, 2010, Slovakia).

***Mycetophila occultans* Lundström, 1913**

Distribution. Widespread and locally frequent throughout Britain; a few scattered records in Ireland, also in Jersey. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Mycetophila ocellus* Walker, 1848**

Distribution. Very common throughout Britain and Ireland, also in Isle of Man and Jersey (map, Fig. 4b). Holarctic, widespread in Europe, also in the Atlantic islands.

Habitat. All types of wooded habitats.

Biology. Polyphagous, mainly in saproxylic fungi including agarics, polypores and wood-encrusting fungi, although recorded from some genera of terrestrial agarics. **British records:** *Amanita rubescens*, *Bjerkandera adusta*, *Chondrostereum purpureum*, *Chroogomphus rutilus*, *Coniophora puteana*, *Cylindrobasidium evolvens*, *Kretzschmaria deusta*, *Mycoacia uda*, *Phlebia radiata*, *Pholiota squarrosa*, *Pleurotus ostreatus*, *Psathyrella candolleana*, *Schizopora paradoxa*, *Sparassis crispa*, *Stereum sanguinolentum*, *Trichoderma viride* (Buxton 1960, Chandler 1993b, Edwards 1925, Trifourkis 1977), *Sarcodontia crocea* (J. Webb), *Phlebia tremellosa* (Fortey and Chandler 2021). **Other records:** *Cortinarius* sp. (Kurina 1998), *Sarcomyxa serotina* (Okada 1939, Japan), *Pleurocybella porrigens* (Hackman and Meinander 1979), *Bjerkandera adusta*, *Phlebia radiata*, *Stereum rugosum* (Jakovlev 2011).

***Mycetophila ornata* Stephens, 1846**

Distribution. Common throughout Britain and Ireland, also in Isle of Man and Jersey. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Polyphagous in saproxylic fungi, mainly polypores and wood-encrusting fungi, and also in the oyster mushroom *Pleurotus ostreatus*. In Britain it is most often found in *Meripilus giganteus*, pupating within the fungus in fragile cylindrical cocoons, with ends looser than sides; the adult may reside for a time within the cocoon before emergence and was noted to emerge suddenly (Buxton 1960). **British records:** *Bjerkandera adusta*, *Cerioporus squamosus*, *Chondrostereum purpureum*, *Fistulina hepatica*, *Mensularia radiata*, *Meripilus giganteus*, *Pleurotus ostreatus*, *Stereum hirsutum*, *Trametes versicolor* (Buxton 1960, Chandler 1993b, Edwards 1925, Madwar 1937, Trifourkis 1977, J. Webb, Fortey and Chandler 2021, J. Hewitt). **Other records:** *Bondarzewia mesenterica* (Ševčík 2006 and 2010, who considered that the record from *Meripilus* by Laštovka (1970) also related to this fungus as it was growing on *Picea abies*). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Mycetophila perpallida* Chandler, 1993**

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man and Jersey. It was earlier confused with *M. fungorum*, from which only males may be separated. In continental Europe it has a generally more southern distribution than *M. fungorum*, but in the British Isles there is no obvious difference in extent of occurrence. Widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Wooded habitats.

Biology. Develops in several genera of boletes and in terrestrial (*Amanita*) and saproxylic (*Armillaria*, *Pluteus*) agarics; it was earlier confused with *M. fungorum* so some rearing records of that species may refer to *M. perpallida*. **British records:** *Amanita muscaria*, *A. rubescens*, *Armillaria*, *Boletus edulis*, *Imleria badia*, *Leccinum scabrum*, *Pluteus cervinus*, *Russula claroflava*, *R. ?cyanoxantha*, *Xerocomus subtomentosus*, *Xerocomellus chrysenteron* (Chandler 1993b, J. Webb), *Calocybe gangraenosa*, *Cortinarius pseudosalor*, *Russula sanguinea* (P. Chandler), *Armillaria mellea*, *Boletus edulis*, *Russula foetens*, *R. velenovskyi*, *R. vesca*, *Xerocomellus pruinatus*, *Xerocomus* sp. (R. Fortey; Fortey and Chandler 2021). **Other records:** Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Mycetophila pictula* Meigen, 1830**

Distribution. Widespread in Britain, but with most records from SE England, also in Jersey. Holarctic, widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Woodland.

Biology. **British records:** reared from a wood-encrusting fungus, interpreted as *Schizopora paradoxa*, forming a slight silky cocoon (Edwards 1925).

***Mycetophila pumila* Winnertz, 1864**

Distribution. Common throughout Britain; widespread in Ireland, also in Jersey. Palearctic, widespread in Europe, also in the Atlantic islands

Habitat. Woodland and carr.

Biology. Unconfirmed. **British records:** reared from an undetermined polypore fungus (Chandler 1978b)

***Mycetophila rudis* Winnertz, 1864**

Distribution. Common throughout Britain; a few scattered Irish records. Widespread in Europe.

Habitat. Woodland.

Biology. Surprisingly not yet recorded. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Mycetophila ruficollis* Meigen, 1818**

Distribution. Frequent in England north to Yorks and Cumbria, and in S Wales, also in Jersey. Widespread in Europe.

Habitat. Broad-leaved woodland.

Biology. Polyphagous in terrestrial and saproxylic agarics. **British records:** *Gymnopus fusipes* (Chandler 1978b), *Armillaria mellea* (Trifourkis 1977), *Hypholoma fasciculare*, *Rhodocollybia butyracea* (R. Fortey; Fortey and Chandler 2021); the record in Chandler (1973) from *Pleurotus cornucopiae* predates revision of the group and recognition of *M. britannica*.

Other records: *Entoloma* sp., *Flammulina velutipes* (Jakovlev 1994, his own rearing in Karelia), *Inocybe geophylla*, *Megacollybia platyphylla*, *Pholiota aurivella*, *Russula delica* (Kurina 1991, 1998), *Crepidotus mollis*, *Hypholoma fasciculare*, *Mycena galericulata*, *M. haematopus*, *M. inclinata*, *M. tintinnabulum*, *Pholiota squarrosa*, *Pluteus cervinus*, *Tricholomopsis rutilans* (Ševčík 2006, 2010). Rearings from several genera by Ribeiro (1990) may refer to *M. britannica*.

***Mycetophila schnablii* (Dziedzicki, 1884)**

Distribution. Restricted in Britain to the Scottish Highlands, where records are clustered in the Spey valley (5 hectads, 1989–2002) and in Glen Affric (3 hectads, 1981–2002), where it is locally frequent, and a more recent record from Darnaway Forest (2.ix.2016, C. Spilling). Palearctic, widespread in Europe.

Habitat. Most sites are pine forest; the Lochanhully site is a strip of birch woodland by a stream adjoining conifer plantations and Dulicht Wood is broad-leaved woodland including aspen.

Biology. Unknown.

***Mycetophila scotica* Edwards, 1941**

Distribution. There are five scattered sites in S England (Great Breach Wood and Croscombe, Somerset, 1986; Hobb's Quarry, Gloucs, 2002; Burr ridge Common, Devon, 2005; Bradfield Wood, Suffolk, 2005, 2006) and two in Scotland (Dingwall, 1909; Urquhart Bay, 1991). Holarctic, widespread in Europe.

Habitat. Damp broad-leaved woodland.

Biology. Unknown.

***Mycetophila sepulta* (Laffoon, 1957)**

Distribution. Widespread in England but only a few Scottish records; recorded from Oswestry, Shropshire but no Welsh records. Widespread in Europe.

Habitat. Woodland.

Biology. Develops in terrestrial and saproxylic agarics. **British records:** *Hypholoma elongatum* (Laštovka and Kidd 1975), *Hebeloma* sp., *Lactarius acerrimus*, *L. pubescens* (J. Webb).

***Mycetophila sigmoides* Loew, 1869**

Distribution. First recorded in Britain at 2 sites in 1998, although not recognised until 2008 (Gibbs 2009, who could already record it from 23 sites in 15 counties) and it is now widely distributed in England north to Yorkshire (57 hectads). It has spread westwards in Europe in the past 20 years, and is evidently a recent arrival in this country, which is actively spreading (map, Fig. 9a). Holarctic, recorded in C Europe.

Habitat. Woodland and parkland.

Biology. Develops in the tough polypore *Daedaleopsis confragosa* that is not favoured much by other insects, and has been reared from this fungus in Britain as well as elsewhere. **British records:** *Daedaleopsis confragosa* (J. Webb, J. Cole). **Other records:** *Fomitopsis*, *Daedaleopsis*, *Trametes* (Zaitzev 2003, Ševčík 2010).

***Mycetophila signata* Meigen, 1830**

Distribution. Mostly northern and western in Britain, most frequent in Scotland where it is widespread in the Highlands, west coast and Hebrides, and in Wales; English records are from Cumbria, Herefordshire, Somerset and Devon, with an old record from Crowborough, Sussex. Most recent records are from Devon and the central Highlands, and there has possibly been a decline elsewhere. Two widely separated Irish records (Glenarm, Co Antrim, 2006, K. Alexander; Ballyvourney Wood, Co Cork, 10.vii.1990, P. Withers). Palearctic, widespread in Europe.

Habitat. Broad-leaved woodland.

Biology. **British records:** *Russula nigricans* (J. Webb). **Other records:** *Lactarius tabidus*, *Neolentinus lepideus* (Jakovlev 1994, his own rearings in Karelia), *Suillus variegatus* (a bolete associated with conifers, Eisfelder 1955, Germany).

***Mycetophila signatoides* Dziedzicki, 1884**

Distribution. Common throughout Britain and Ireland, also in Scilly Isles (Tresco, 6.x.1970, A.M. Hutson). Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. Develops in boletes, *Paxillus* and terrestrial agarics of the family Russulaceae (*Russula*, *Lactarius*). Chandler (1978b) suggested that records from *Lactarius*, *Paxillus* and *Russula* needed confirmation, which has since been provided. Ševčík (2006), however, suggested it was specific to Boletaceae and Paxillaceae. **British records:** *Boletus* sp. (Edwards 1925), *Lactarius* ?*quietus*, *Suillellus luridus*, *Tapinella atrotomentosa* (Chandler 1993b), *Paxillus involutus*, *Xerocomus subtomentosus* (Buxton 1960, P. Chandler, J. Webb), *Russula nigricans* (Buxton 1960). **Other records:** *Boletus aereus*, *B. edulis*, *B. reticulatus*, *Caloboletus calopus*, *Lactarius deliciosus*, *Leccinum aurantiacum*, *L. scabrum*, *Paxillus involutus*, *P. rubicundulus*, *Russula delica*, *Xerocomellus chrysenteron* (Kurina 1991, Ševčík 2006 and 2010, and Russian records cited as *M. assimilis* by Jakovlev 1994), *Gyrodon lividus* (Rimšaite 2000), *Leccinum leucophaeum* (Matile 1963, as *M. conformis*; assigned in error by Jakovlev 1994 to *Hygrophorus leucophaeus*).

***Mycetophila sordida* van der Wulp, 1874**

Distribution. Frequent throughout Britain; widespread in Ireland. Holarctic, widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. **No British records.** **Other records:** reared from the terrestrial fungus *Thelephora palmata* (Ševčík 2010).

***Mycetophila spectabilis* Winnertz, 1864**

Distribution. Widespread throughout Britain, though with relatively fewer recent records (only 17 of 71 hectads are post-2000). In Ireland two records from near the east coast (Newcastle, Co Down, 1912, J.J.F.X. King; Redcross, Co Wicklow, 18.ix.1968, Chandler). Widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. Develops in boletes (*Boletus edulis*, *Rubroboletus satanas*) and in terrestrial (*Russula*, *Lactarius*, *Tricholoma*) and saproxylic (*Armillaria*, *Pleurotus*) agarics. **No British records.** **Other records:** *Armillaria mellea*, *Boletus edulis*, *Rubroboletus satanas*, *Russula aurea*, *R. cyanoxantha*, *Tricholoma portentosum* (Canzanelli 1941, Italy), *Lactarius* sp., *Tricholoma* sp. (Eisfelder 1955, Germany), *Lactifluus piperatus* (Plassmann 1971, Germany), *Pleurotus ostreatus*, *Russula fragilis* (Dely-Draskovits 1974, Hungary), *Pleurotus cornucopiae*, *Lactifluus vellereus* (Ševčík 2006, 2010, Czech Republic).

***Mycetophila stolidi* Walker, 1856**

Distribution. Widespread in Britain and frequent in S England and S Wales, with scattered records further north and a few in Scotland; only one Irish record (Lough Neagh, 2016), also in Jersey. There was some taxonomic difficulty in separation from *M. freyji*, but *M. stolidi* appears the commoner of these species. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Mycetophila stricklandi* (Laffoon, 1957)**

Distribution. A poorly known species, with scattered records. It was first recognised from Spring Wood, Boltby in Yorkshire in 1996 (also a site for *Allodiopsis korolevi*) but earlier specimens were found in collections from Langthwaite in Yorkshire (1981) and Tummel Forest, Perthshire (1973) (Chandler 2001a). It has since been recorded at 7 more sites in Britain: West Stow Country Park and King's Forest, Suffolk (2002); Wortley Top Forge, Yorks (2009); Glapthorn Cow Pasture, Northants (2016); Flitwick Moor, Beds (2018); Zebon Copse, Hants (2018); Minera, N Wales (2018). Also one Irish record (Killakee, Co Dublin, 8.v.1988, Chandler). Holarctic, other European records are only from the Nordic region.

Habitat. Woodland.

Biology. Unknown.

***Mycetophila strigata* Staeger, 1840**

Distribution. Frequent throughout Britain; there is one Irish record (Moy, Co Tyrone, 1984–1985, M. Boston), also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. **No British records.** **Other records:** reared from the terrestrial agaric *Calocybe gambosa* (Ševčík 2006).

***Mycetophila strigatoides* (Landrock, 1927)**

Distribution. Most records are for Scotland, where it is widely distributed (7 hectads) and SW England (11 hectads); there are also two records for Wales (Hafod Garregog, 1999, Merthyr Tydfil, 2007), and two from the west of Ireland (Westport Demesne, 29.ix.1977, Chandler; Connemara National Park, vii.1994, M. Speight). Palearctic, widespread in Europe, also in N Africa.

Habitat. Damp broad-leaved woodland.

Biology. **No British records.** **Other records:** *Lentinus substrictus*, *L. tigrinus*, *Picipes melanopus* (Ševčík 2006, Czech Republic and Slovakia), *Russula* sp., *Trametes* sp. (Russian records cited by Jakovlev 1994, which Ševčík (2006) considered to need confirmation, especially in case of *Russula*), *Lyophyllum decastes* (Rimšaite 2000), *Picipes melanopus* (Jakovlev 2011).

***Mycetophila stylata* (Dziedzicki, 1884)**

Distribution. Common in Scotland with a scattered distribution in England and Wales; widespread in Ireland, also in Isle of Man. Palearctic, widespread in Europe.

Habitat. Woodland.

Biology. No British records. **Other records:** *Lactarius* sp. (Russian record cited by Jakovlev 1994). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Mycetophila stylatiformis* Landrock, 1925**

Distribution. First recorded in Britain at Windsor Forest, Berks in 2014 (Chandler 2015a) and since found to be numerous at several sites in S England and East Anglia, with the most northerly record at Moseymoor Wood, Staffs (25.vi.2018, A. Cunningham), so possibly a recent arrival that is spreading rapidly (23 hectads) (map, Fig. 9b). Widespread in W and C Europe, not yet recorded from the Nordic region.

Habitat. Woodland.

Biology. Unknown.

***Mycetophila sublunata* Zaitzev, 1998**

Distribution. First found in Britain in 2011 at five sites in Devon, Sussex, Oxfordshire and Suffolk (Chandler 2011, 2012), and has since turned up widely at other sites (32 hectads in S England north to Lincs). Presumably a recent arrival in this country that had already become widespread before detection. Palaearctic, widespread in N Europe.

Habitat. Woodland.

Biology. Unknown.

***Mycetophila subsigillata* Zaitzev, 1999**

Distribution. Frequent throughout Scotland, but scarce further south with a few records from Wales (8 hectads), N England (3 hectads), S Yorkshire (Thorne Moor) and Devon (Spreacombe Chapel Wood); widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. No British records. **Other records:** *Hohenbuehelia petaloides* on decayed slash-residues from clear-cut forest (Jakovlev 2011). Some of the continental rearing records from boletes and terrestrial agarics of the allied species *M. sigillata*, which has not been confirmed to occur in the British Isles, may refer to this species.

***Mycetophila sumavica* (Laštovka, 1963)**

Distribution. Widespread in Britain, but most frequent in Scotland; one Irish record (Breen Wood, Co Antrim) was cited by Chandler (2018b). Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Mycetophila tridentata* Lundström, 1911**

Distribution. Frequent throughout England with only a few Scottish records, commonest in SE England and East Anglia. Widespread in Europe.

Habitat. Woodland and parkland.

Biology. Develops in polypores, its cocoons being embedded in the fungus; adults often observed near *Laetiporus sulphureus*. **British records:** *Ganoderma applanatum* (P. Chandler, Chandler 1978b), *Inonotus cuticularis*, *Laetiporus sulphureus* (Chandler 1993b).

***Mycetophila trinitata* Staeger, 1840**

Distribution. Frequent throughout Britain, but commonest in the south of England; widespread in Ireland, also in Jersey. Holarctic, widespread in Europe, also in the Atlantic islands.

Habitat. Woodland.

Biology. British records: *Bjerkandera adusta*, *Trametes versicolor* (Buxton 1960, Edwards 1925, Trifourkis 1977, P. Chandler, J. Webb), *Stereum* (Chandler 1978b). Buxton only reared it from *B. adusta*, as did J. Webb, while Edwards reared it only once from this fungus but obtained it several times from *T. versicolor*. **Other records:** also *B. adusta* (Ševčík 2006 and 2010, who considered it specific to this fungus).

***Mycetophila uliginosa* Chandler, 1988**

Distribution. A scattered distribution in SE England north to Lincs (28 hectads) and a cluster of records in W Yorkshire (3 hectads); there is one Irish record (Moy, Co Tyrone, 1984–1985, M. Boston). Widespread but scarce in W and N Europe.

Habitat. Damp broad-leaved woodland and carr.

Biology. British records: *Phellinus pomaceus* (J. Webb).

***Mycetophila unicolor* Stannius, 1831**

Distribution. Common in Wales and in England north to Cumbria, and several Scottish records; a few scattered Irish records near the coast, also in Isle of Man and Jersey. Widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Woodland.

Biology. Unknown.

***Mycetophila uninotata* Zetterstedt, 1852**

Distribution. A mainly northern and western distribution, with no records for SE England; probably overlooked among other members of the *M. ruficollis* group. Widespread in Europe.

Habitat. Wooded habitats.

Biology. No British records. Other records: terrestrial agarics of the genera *Gymnopus*, *Rhodocollybia*, *Cortinarius* and *Lactarius* (Hackman and Meinander 1979, Finland; Kurina 1994 and 1998, Estonia).

***Mycetophila unipunctata* Meigen, 1818**

Distribution. Common throughout Britain and Ireland, also in Scilly Isles (Tresco, 6.x.1970, A.M. Hutson) and Jersey. Holarctic, widespread in Europe.

Habitat. Woodland and wetlands.

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Biology. **British records:** *Rigidoporus sanguinolentus* (R. Fortey, November 2020, surprisingly the first rearing record; Fortey and Chandler 2021). **Other records:** Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Mycetophila vittipes* Zetterstedt, 1852**

Distribution. Common throughout Britain and Ireland. Palaearctic, widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Woodland.

Biology. Develops in myxomycetes. **British records:** *Arcyria denudata*, *A. incarnata* (Buxton 1954).

***Mycetophila v-nigrum* Lundström, 1913**

Distribution. Very localised (11 hectads, 8 in Scotland, 4 of those post-2000), with a cluster of records at the east end of Loch Ness and in the Findhorn valley, then in the west of Scotland (Glasdrum, Bonhill), the north of England (Scargill, 1992; Ashberry Pastures, 1990) and Dorset (Canford Heath, 1993). Widespread in Europe.

Habitat. Damp broad-leaved woodland with streams.

Biology. Unknown.

Genus *Phronia* Winnertz

Slender to short-bodied gnats with slender antennae and legs, varying from all dark-bodied to extensively yellow marked, with legs mainly yellow, sometimes with dark tips to femora or dark coxae. Clypeus broader than high. Mesonotum bearing scattered bristles and dorsocentral series. Anepisternum with some bristles near upper and posterior margins. Anepimeron with bristles absent. Two pairs of scutellars, 2 proepisternals. Wing usually unmarked but a few species with distinct brown markings. Costa sometimes produced a little beyond tip of R_{4+5} . Vein Sc ending free, although often reaching halfway to base of Rs. Base of posterior fork well beyond that of the median fork and posterior fork less than half length of median fork. False vein reaching level with base of posterior fork. CuP short. Fork veins and r-m setulose, bm-m bare. Hind coxa always without a posterobasal bristle. Mid and hind tibiae with series of small anterior and dorsal bristles, at most a little longer than the diameter of the tibia; hind tibia also with a series of short posterior bristles, which may occupy its apical half or more. Wing length 2.0–3.5 mm.

Male genitalia often with one or more corrugations bearing ranks of close-set thick black spinules on middle portion of gonostylus. Female cercus two-segmented.

This key is primarily based on male genital characters and most females in this genus cannot be reliably determined. Species with distinct wing markings (e.g. *P. biarcuata* and *P. humeralis*) are usually easily recognised in both sexes and *P. basalis* may be recognised by the extension of the costa in both sexes, but constant external characters are generally lacking. Females have been identified by association for a good number of

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species but differences in ovipositor structure between allied species are often slight. Coloration is variable and is summarised for most species within square brackets in key couplets.

There are 62 European species, many of them boreal in distribution. Dziedzicki (1889) monographed the genus, providing the first taxonomic work on fungus gnats that illustrated the structure of genitalia as a means of identification. Hackman (1970) increased knowledge of the north European species. Gagné (1975) revised the Nearctic species, many of which are Holarctic, including 22 of the British species. In Britain 36 species have been recorded, of which 32 are included in the key by Zaitzev (2003), who figured 50 species.



Figure 279. (a) *Phronia humeralis* ♂; (b) *Phronia braueri* ♂.

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Key to *Phronia* Winnertz

1. Gonocoxites strongly concave on ventral apical margin, so that their length medially is around half their lateral length in ventral view 2
- Gonocoxites with ventral apical margin less strongly concave, straight, convex or with shorter angular excavation 7
2. Legs very long and thin; hind tibia with ventral bristles. Antenna with sixth flagellomere about 4 x as long as broad. Dorsal lobe of gonostylus with two strong bristles bent medially (arrowed in figure of gonostyli). [Body all dark; hind coxa dark, hind femur dark apically] *tiefii* Dziedzicki, 1889 (p. 327)
- Legs not long and thin; hind tibia without ventral bristles. Antenna with sixth flagellomere at most twice as long as broad 3



Figure 280. *Phronia tiefii*:
(a) ventral and (b) dorsal
views of ♂ genitalia;
(c) gonostyli dorsal view.

3. Gonocoxites elongate with deep medial excavation and without a row of strong bristles near ventral apical margin. Hind femur yellow except for extreme tip 4
- Gonocoxites short and broad with a row of long strong bristles (lower arrow in figure of *P. nitidiventris*) near ventral apical margin. Hind femur darkened apically 5

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4. Gonostylus with ventral lobe appearing C-shaped in ventral view, its medial branch (arrowed) narrower and lacking bristles except for short ones (arrowed in figure of gonostylus) apically. [Body all dark; mid and hind coxa dark, legs otherwise yellow] *caliginosa* Dziedzicki, 1889 (p. 321)
- Gonostylus with ventral lobe broadly rounded, with curved digitate process (arrowed in ventral view) on its medial apical margin, diverging from its fellow. [Mesonotum yellowish brown, abdomen dark; hind coxa and femur dark apically] *electa* Dziedzicki, 1889 (p. 322)

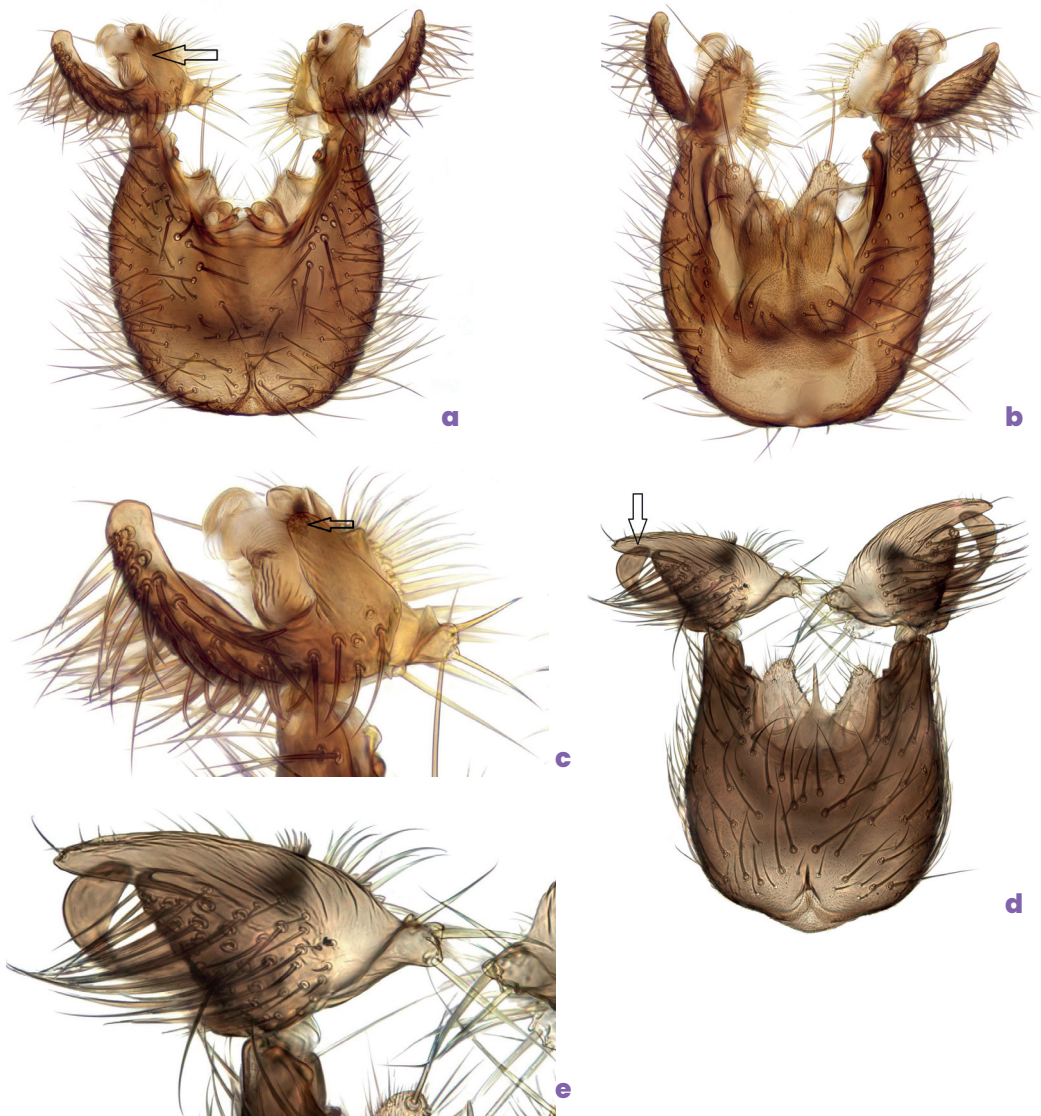


Figure 281. *Phronia caliginosa*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) gonostylus. *Phronia electa*: (d) ventral view of ♂ genitalia; (e) gonostylus.

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5. Gonostylus with lateral (ventral) lobe (middle arrow) small and rounded apically, shorter than gonocoxites; medial lobe (upper arrow) longer than lateral lobe and slender apically. [Mesonotum with more or less fused dark stripes, yellow laterally; tergites 1-3 with yellow apical triangles; genitalia dark; legs all yellow]
..... *nitidiventris* (van der Wulp, 1858) (p. 324)
- Gonostylus with lateral (ventral) lobe as long as or longer than gonocoxites and longer than medial lobe (upper arrow in figure of ventral view of *P. nigricornis*) 6

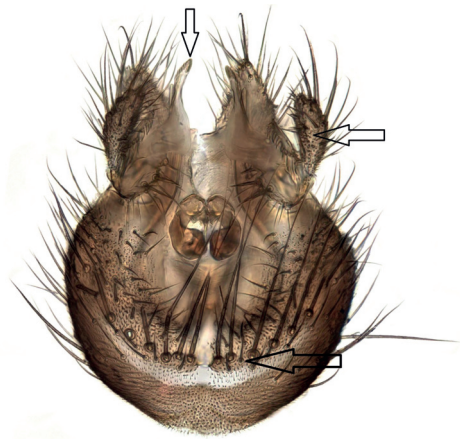


Figure 282. Ventral view of ♂ genitalia
Phronia nitidiventris.

6. Gonostylus with lateral (ventral) lobe (lower arrow) broadly rounded, about as long as gonocoxites. [Body and mid and hind coxae all dark; hind femur dark apically]
..... *nigricornis* (Zetterstedt, 1852) (p. 324)

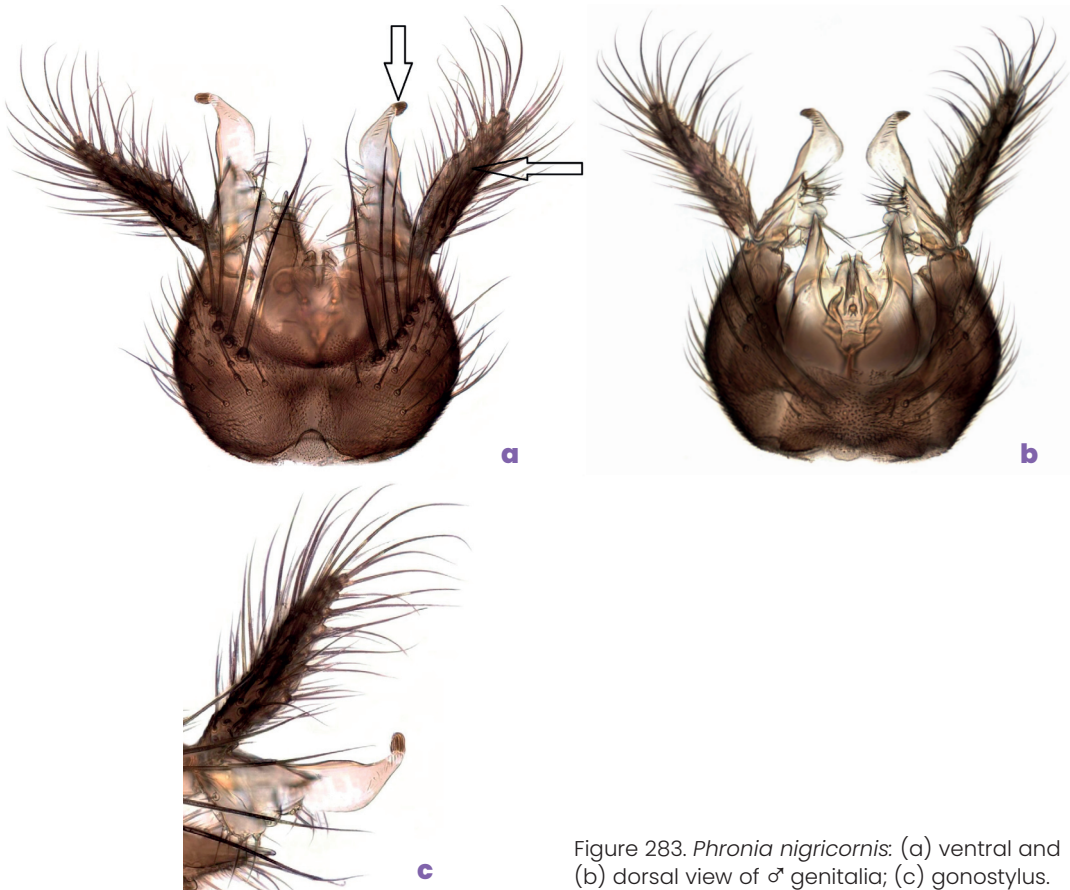


Figure 283. *Phronia nigricornis*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) gonostylus.

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- Gonostylus with lateral (ventral) lobe (arrowed) elongate, distinctly longer than gonocoxites. [Mesonotum dark; tergites 2-3 broadly yellow laterally, 4 with vague yellow patch basally] *longelamellata* Strobl, 1898 (p. 324)



Figure 284. *Phronia longelamellata*. (a) posteroventral view; (b) gonostylus.

- 7. Ventral apical margin of gonocoxites produced as a medial process. Hind femur entirely yellow 8
- Ventral apical margin of gonocoxites concave or straight, not produced medially (a narrow medial process inset in shallow excavation in *P. siebeckii*) 11

- 8. Gonocoxites with medial process narrow and sharply narrowed apically (arrowed). Ventral lobe of gonostylus rounded and strongly bristled. [Mesonotum with yellow humeral area; abdomen all dark including genitalia; legs all yellow] *flavipes* Winnertz, 1864 (p. 323)

- Gonocoxites with medial process broad, at most gently narrowed apically 9

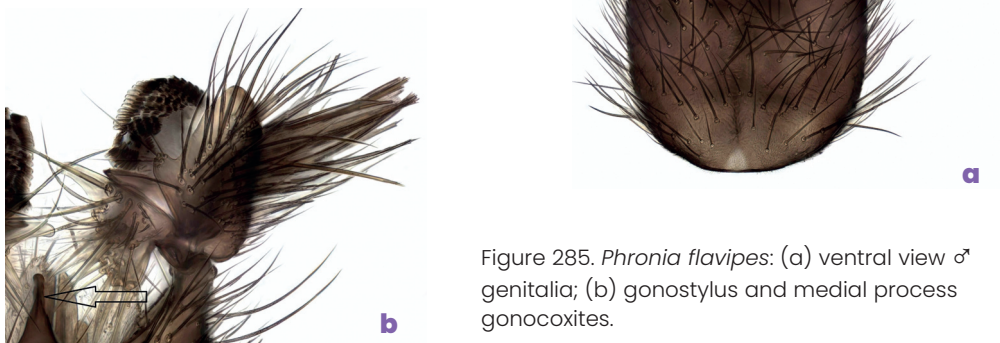


Figure 285. *Phronia flavipes*: (a) ventral view ♂ genitalia; (b) gonostylus and medial process gonocoxites.

9. Gonocoxites with medial process shallowly bilobed (arrowed in ventral view). Dorsal lobe of gonostylus elongate, narrow basally and broadened apically. Hind tibia without ventral bristles. [Mesonotum with more or less fused dark stripes, yellow laterally; tergites 2–3 yellow laterally; genitalia dark] *sudetica* Dziedzicki, 1889 (p. 326)
- Gonocoxites with medial process not apically bilobed. Dorsal lobe of gonostylus broadly rounded. Hind tibia with short weak ventral bristles 10

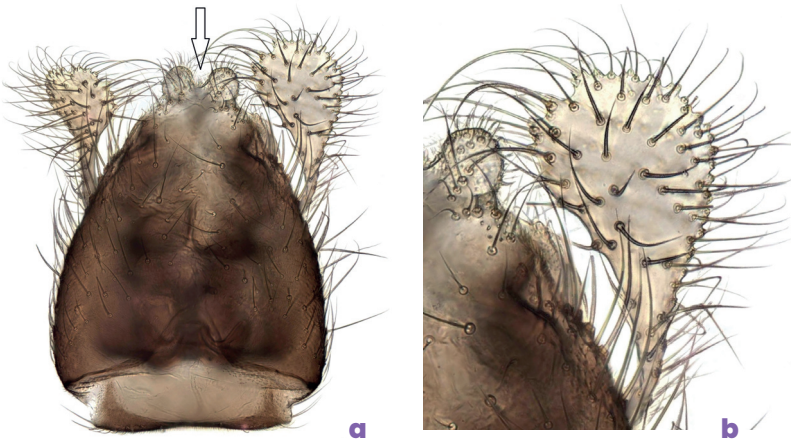


Figure 286. *Phronia sudetica*: (a) ventral view ♂ genitalia; (b) gonostylus and medial process gonocoxites.

10. Ventral lobe of gonostylus broadly rounded apically (in lateral view); medial lobe with extensive corrugations bearing ranks of spinules. Gonocoxites with medial process tapered before heart-shaped apex (arrowed). [Body all dark, with vaguely paler humeral area; legs all yellow] *exigua* (Zetterstedt, 1852) (p. 323)
- Ventral lobe of gonostylus with narrower apical part (arrowed); medial lobe with more restricted ranks of spinules. Gonocoxites with medial process expanded apically (arrowed). [Body all dark; hind coxa dark apically] *egregia* Dziedzicki, 1889 (p. 322)



Figure 287. *Phronia exigua*: (a) ventral view ♂ genitalia; (b) gonostylus and medial process gonocoxites.



Figure 288. *Phronia egregia*: (a) ventral view ♂ genitalia; (b) gonostylus and medial process of gonocoxites.

11. Cerci (arrowed in dorsal and lateral views) elongate apically, strikingly longer than gonocoxites. Ventral lobe of gonostylus deeply bilobed, the ventral branch broad, bristled and rounded apically, the dorsal branch (arrowed) slender, bare and slightly enlarged apically. Gonocoxites with broad angular ventral apical excavation. [Mesonotum yellow with brown stripes; tergites 1-4 more or less yellow laterally, extended along base of 3 and 4] *vitrea* Plassmann, 1999 (p. 327)
- Cerci usually broad, sometimes tapered apically but not noticeably longer than gonocoxites 12

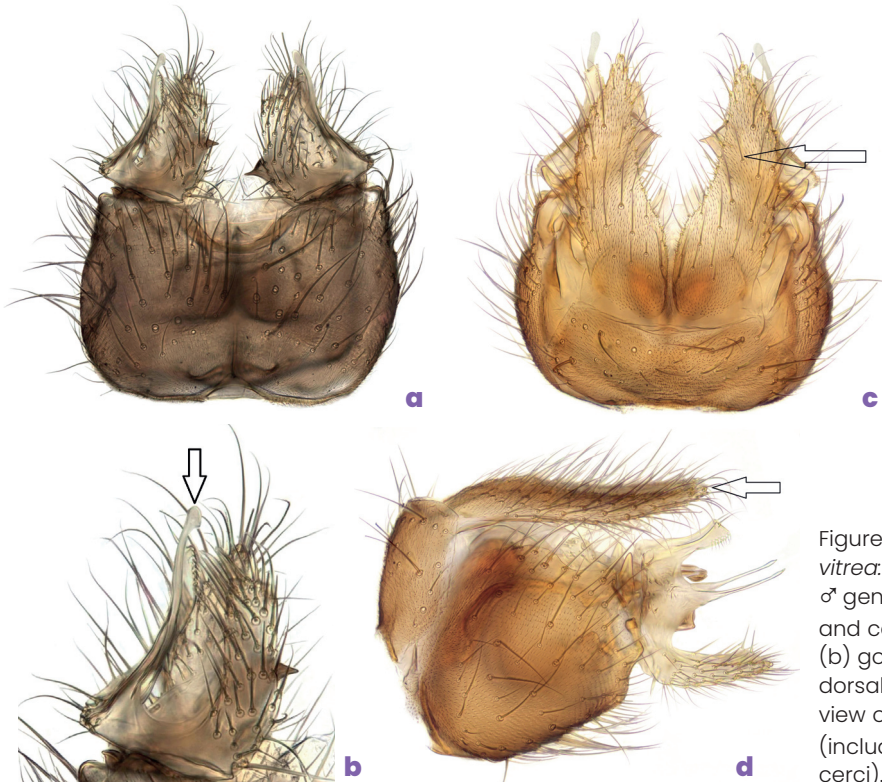


Figure 289. *Phronia vitrea*: (a) ventral view of ♂ genitalia (tergite 9 and cerci removed) and (b) gonostylus; (c) dorsal and (d) lateral view of ♂ genitalia (including tergite 9 and cerci).

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12. Gonostylus with an additional basoventral medially directed elongate, more or less cylindrical, process, usually bearing two apical bristles (arrowed in *P. bicolor*) 13
- Gonostylus without such an additional process 21
13. Ventral lobe of gonostylus deeply bilobed, produced as a more or less narrow process on both lateral and medial margins 14
- Ventral lobe of gonostylus otherwise formed, if bilobed with differently shaped lobes 17
14. Ventral lobe of gonostylus with medial branch bare apically (arrowed). Dorsal lobe of gonostylus with straight edge bearing a row of strong bristles equal in strength. [Mesonotum yellow laterally; tergites 2-4 yellow basally; mid and hind coxae with dark patches; hind femur dark apically] *cinerascens* Winnertz, 1864 (p. 322)
- Ventral lobe of gonostylus with medial branch bearing short bristles apically. Dorsal lobe of gonostylus with curved edge with bristles not equal in strength 15



Figure 290. Ventral view of ♂ genitalia *Phronia*: (a) *cinerascens*; (b) *tenuis*.

15. Ventral lobe of gonostylus with medial branch bearing at least three short bristles apically (arrowed). Gonostylus much shorter than gonocoxites, which have a shallowly concave ventral apical margin without strong submarginal bristles. [Mesonotum yellow on humeral area; tergites 2-4 yellow basally; hind coxa dark; hind femur dark apically] *tenuis* Winnertz, 1864 (p. 327)
- Ventral lobe of gonostylus with medial branch bearing only two short bristles apically (upper arrow for *P. coritanica*). Gonostylus almost as long as gonocoxites, which have a broad ventral apical excavation bearing a row of strong submarginal bristles 16
16. Gonocoxites evenly and shallowly concave on apical margin. [Mesonotum yellow laterally; tergite 2 yellow laterally, 3 basally; hind femur dark apically] *bicolor* Dziedzicki, 1889 (p. 321)
- Gonocoxites with apical excavation having a stepped appearance (lower arrow). [Mesonotum yellow with three dark stripes; tergites 2-4 narrowly yellow basally; hind femur dark at tip] *coritanica* Chandler, 1992 (p. 322)



Figure 291. Ventral view of ♂ genitalia *Phronia* (a) *bicolor*; (b) *coritanica*.

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17. Gonocoxites elongate, depressed, usually with basal two fifths yellow, otherwise brown (rarely all brown); a group of short spinose bristles near ventral apical margin medially. Gonostylus with ventral lobe small and sickle-shaped, with short rounded bristled medial branch (arrowed). [Mesonotum yellow with brown stripes; tergites 2-5 yellow basally] *notata* Dziedzicki, 1889 (p. 325)
- Gonocoxites differently constructed 18

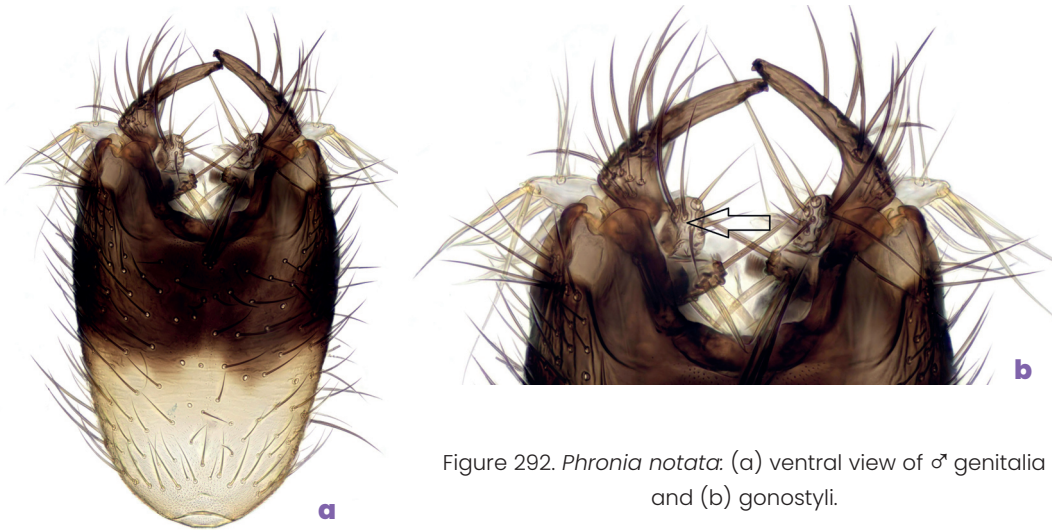


Figure 292. *Phronia notata*: (a) ventral view of ♂ genitalia and (b) gonostyli.

18. Ventral apical margin of gonocoxites with angular excavation medially, giving a stepped appearance. Gonostylus with ventral lobe bilobed, the lateral branch elongate and bare except for blunt tip with short bristles, the medial branch short and bristly 19
- Ventral apical margin of gonocoxites with wider excavation or straight edged. Gonostylus with ventral lobe deeply bilobed with a broad bristly lateral branch and a narrower medial branch. Wing unmarked 20
19. Gonostylus with medial (ventral) branch of ventral lobe produced to a point apically (arrowed in figure of gonostylus). Gonocoxites with medial excavation broader and shallow (arrowed in ventral view). A distinct brownish mark behind posterior fork of wing (arrowed) usually apparent in both sexes. [Mesonotum with sides or only humeral area yellow; tergites 2-4 with more or less narrow yellow apical markings; hind coxa dark, hind femur dark apically] *humeralis* Winnertz, 1864 (p. 323)
- Gonostylus with medial (ventral) branch of ventral lobe bluntly rounded (arrowed). Gonocoxites with medial excavation narrower and deeper (arrowed). Wing unmarked. [Mesonotum with yellow humeral area; tergites 2-4 yellow apically, triangular patches on 3-4; hind coxa and femur dark apically] *forcipula* Winnertz, 1864 (p. 323)

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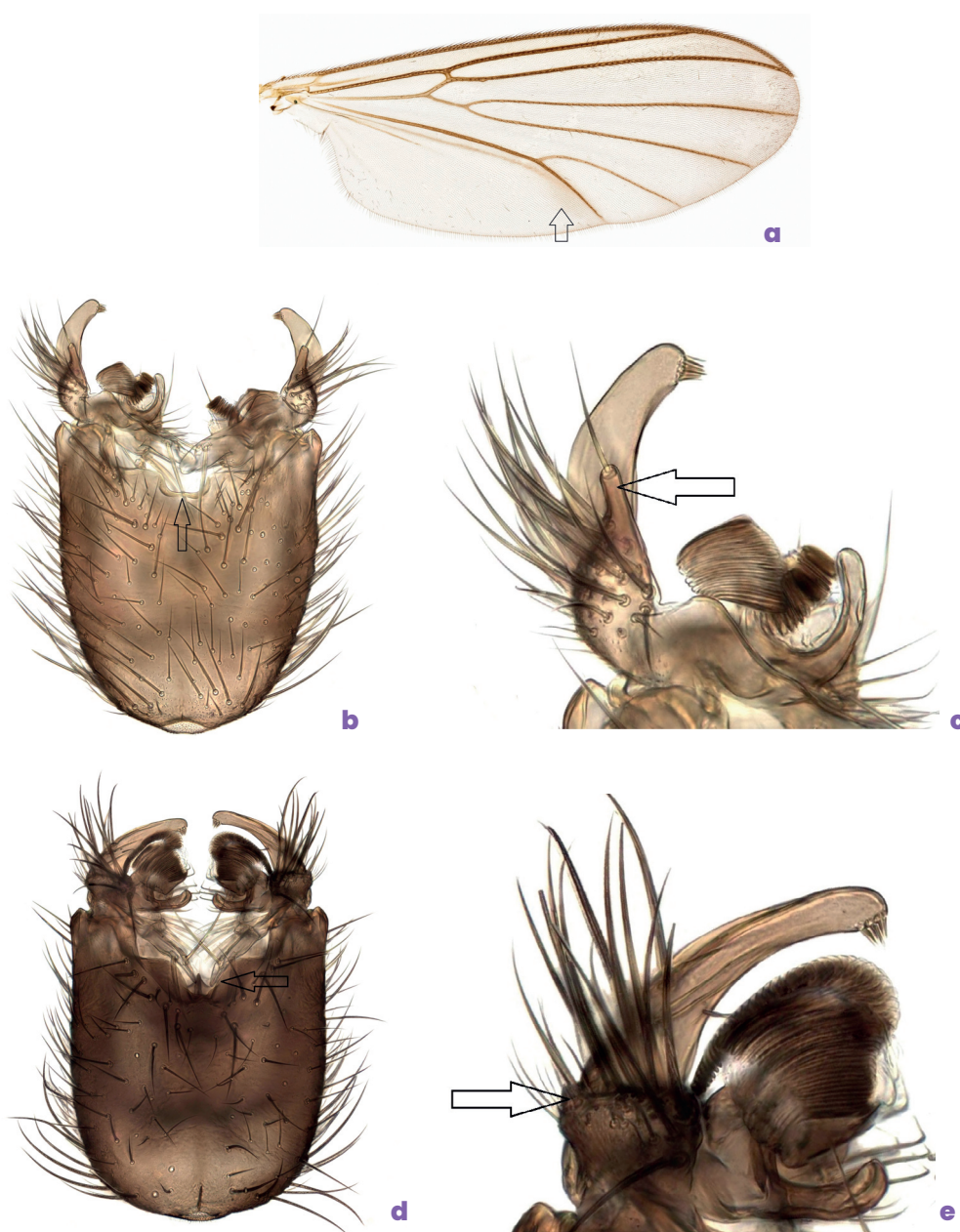


Figure 293. *Phronia humeralis*: (a) wing; (b) ventral view of σ genitalia; (c) gonostylus.
Phronia forcipula: (d) ventral view of σ genitalia; (e) gonostylus.

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20. Gonostylus with medial branch of ventral lobe apically broadened, bare except for fine setulae on apical margin (arrowed in figure of gonostylus). Ventral apical margin of gonocoxites with broad shallow medial excavation. Costa widely exceeding tip of vein R_{4+5} (arrowed). [Mesonotum with yellow humeral area; tergites 2-4 yellow basally or all dark; hind femur brownish at tip] *basalis* Winnertz, 1864 (p. 321)
- Gonostylus with medial branch of ventral lobe slender and bearing 1 or 2 long bristles at tip (upper arrow). Ventral apical margin of gonocoxites shallowly convex on each side of a medial concave area (lower arrow). Costa not widely exceeding tip of vein R_{4+5} [Mesonotum yellow with three more or less fused brown stripes; tergites 1-2 yellow laterally, gonocoxites brownish] *persimilis* Hackman, 1970 (p. 325)

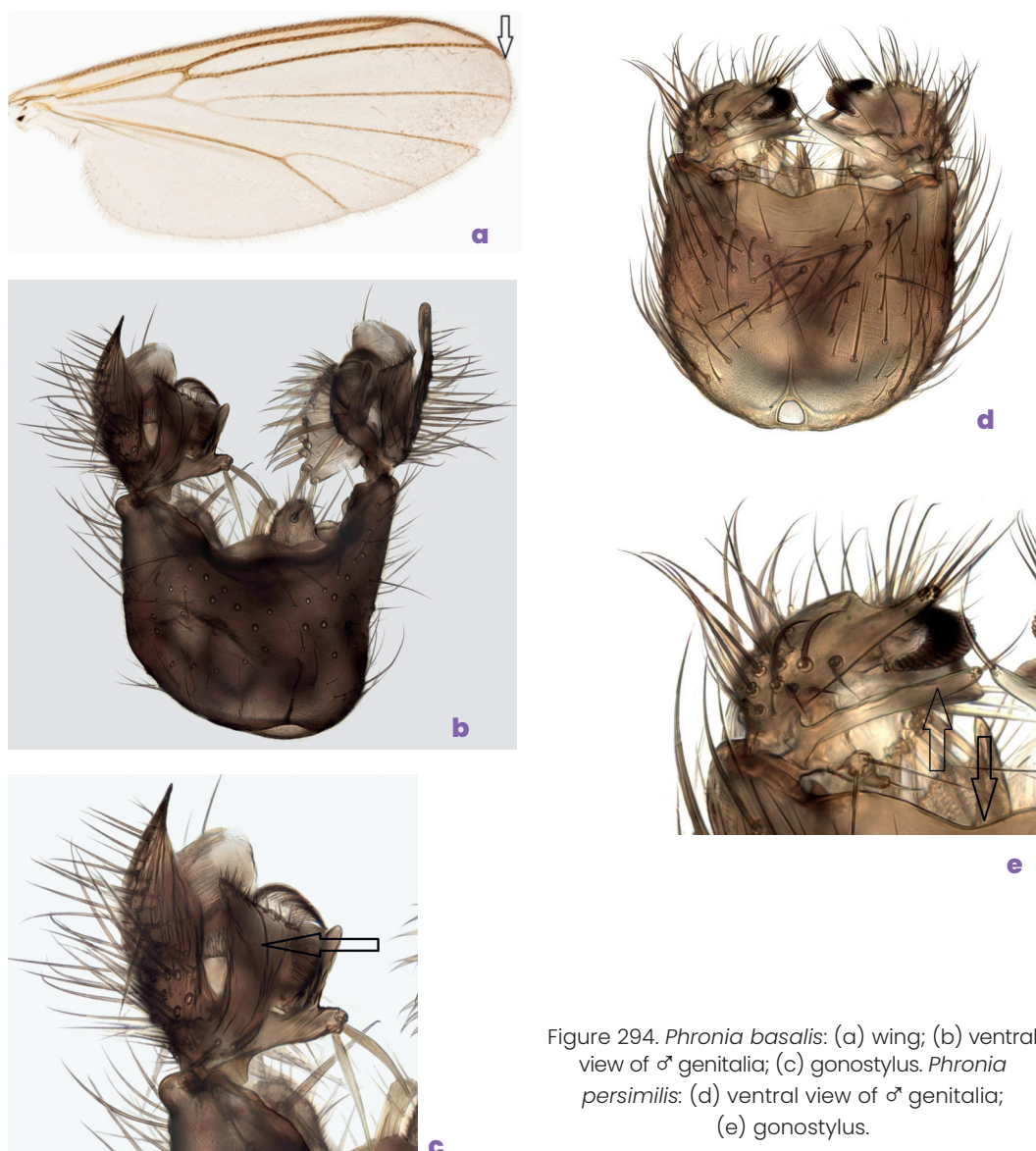


Figure 294. *Phronia basalis*: (a) wing; (b) ventral view of ♂ genitalia; (c) gonostylus. *Phronia persimilis*: (d) ventral view of ♂ genitalia; (e) gonostylus.

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21. Gonocoxites with distinct ventral excavation apically 22
- Gonocoxites with any apical excavation weak or absent 28
22. Ventral excavation of gonocoxites with a short apically rounded median process (arrowed). Gonocoxites usually yellow. [Mesonotum yellow with three brown stripes; tergites 2-5 with more or less large yellow patches basally; hind femur narrowly dark apically] *siebeckii* Dziedzicki, 1889 (p. 326)
- Ventral excavation of gonocoxites without a process 23

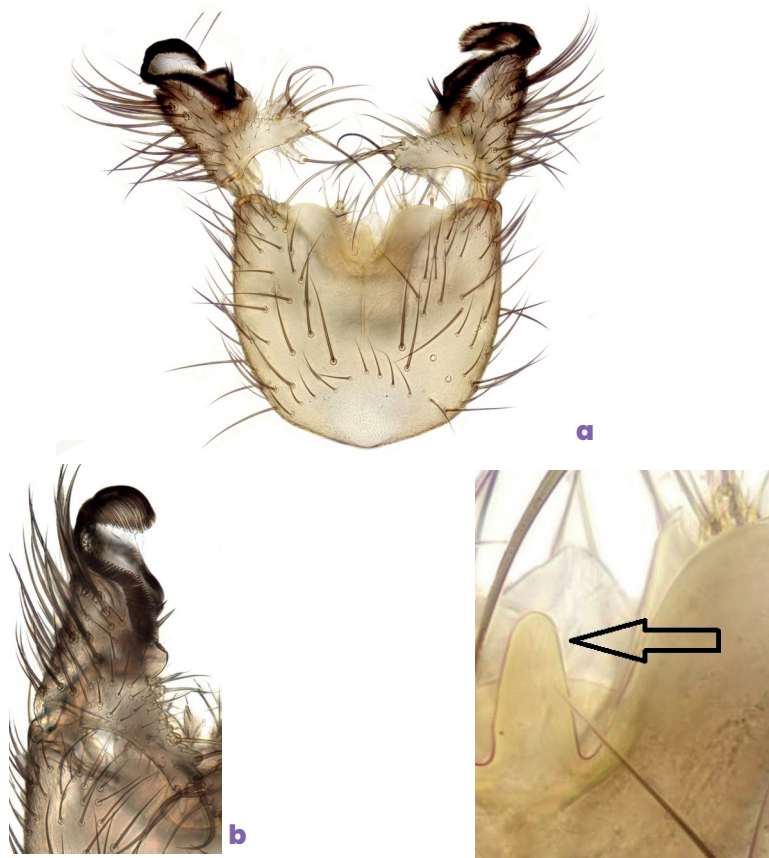


Figure 295. *Phronia siebeckii*: (a) ventral view; (b) gonostylus; (c) medial process of gonocoxites.

23. Ventral excavation of gonocoxites angular or stepped 24
- Ventral excavation of gonocoxites broadly rounded 26

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24. Gonostylus with ventral lobe bifurcate apically with a group of bristles apically on each branch (both branches arrowed in dorsal view). Genitalia yellow. [Mesonotum yellow laterally; tergites 2-4 yellow basally to broadly yellow laterally; hind coxa and femur dark apically] *conformis* (Walker, 1856) (p. 322)
- Gonostylus with ventral lobe comprising a broad medial part bearing two strong bristles (arrowed in figure of gonostylus for *P. forcipata* and in that of internal view of gonostylus for *P. braueri*) and a deeply bilobed dorsolateral part. Genitalia brown 25

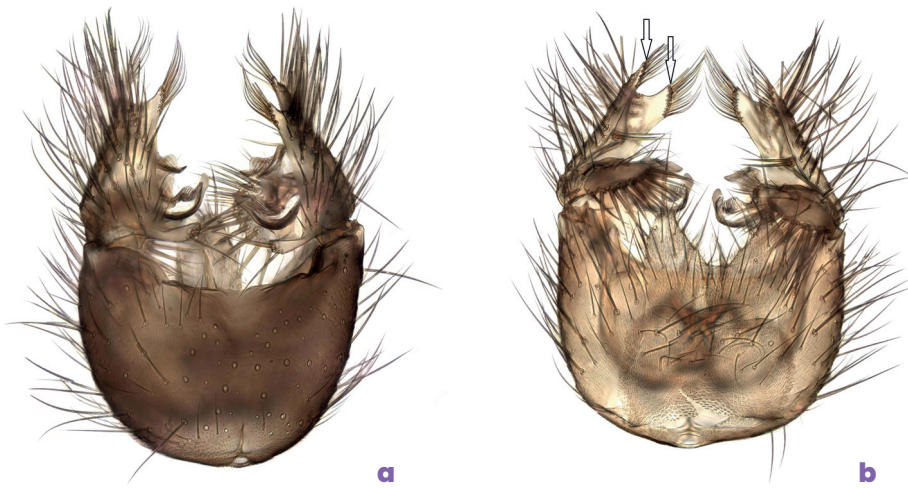


Figure 296. *Phronia conformis*: (a) ventral and (b) dorsal views of ♂ genitalia.

25. Dorsolateral part of ventral lobe of gonostylus with ventral branch apically rounded and strongly bristled, longer than narrower bluntly pointed dorsal branch, which has fine bristling and is bare apically (arrowed in dorsal view). [Mostly dark-bodied; Mesonotum with yellow humeral area; tergites 2-3 with more or less distinct yellowish patches; hind femur dark at extreme tip] *forcipata* Winnertz, 1864 (p. 323)
- Dorsolateral part of ventral lobe of gonostylus with bristly ventral branch more angular and distinctly shorter than basally broad and finely bristled dorsal branch (arrowed in ventral view of gonostylus). [Mesonotum with dark stripes more or less fused dorsally, yellow laterally; tergites 2-3 with yellowish patches laterally] *braueri* Dziedzicki, 1889 (p. 321)

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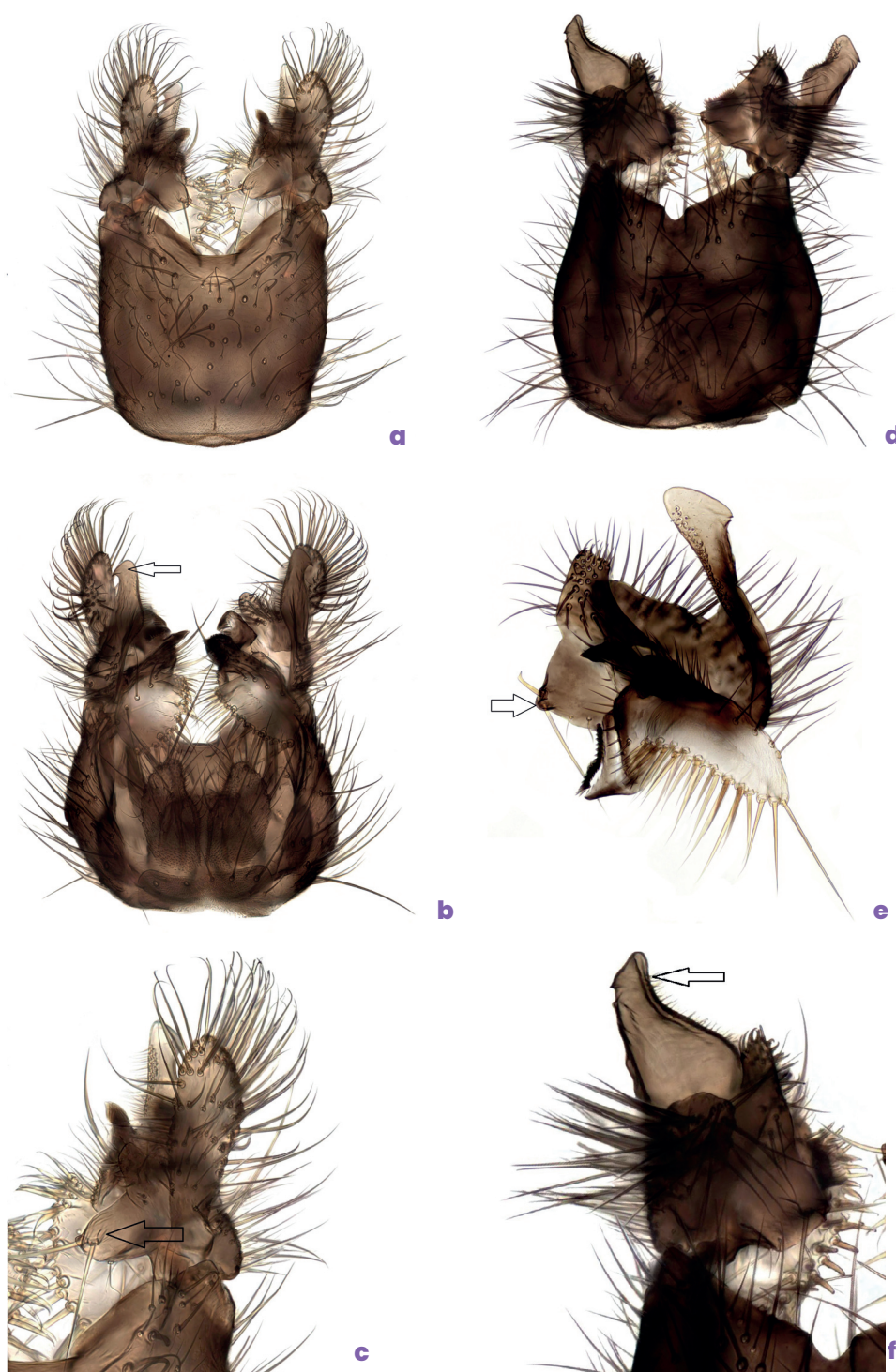


Figure 297. *Phronia forcipata*: (a) ventral and (b) dorsal views of ♂ genitalia; (c) gonostylus ventral view. *Phronia braueri*: (d) ventral view of ♂ genitalia; (e) gonostylus internal view; (f) gonostylus ventral view.

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26. Gonostylus with ventral lobe shorter than broad, with a nearly straight apical margin bearing a row of bristles; bare on the adjacent surface of its apical half (arrowed). Aedeagus short and broad. [Mesonotum yellow with brown stripes; tergites 2-4 yellow laterally, reaching hind margin on 2-3, basal triangle on 4] *petulans* Dziedzicki, 1889 (p. 325)
- Gonostylus with ventral lobe longer than broad with irregular apical margin 27



Figure 298. *Phronia petulans*: (a) ventral view of ♂ genitalia and (b) gonostyli.

27. Gonostylus with ventral lobe bearing a bare digitate dorsal process (arrowed) distally. Hind femur dark apically. [Mesonotum dark with yellow humeral area; tergites 2 (-3) yellow laterally] *disgrega* Dziedzicki, 1889 (p. 322)

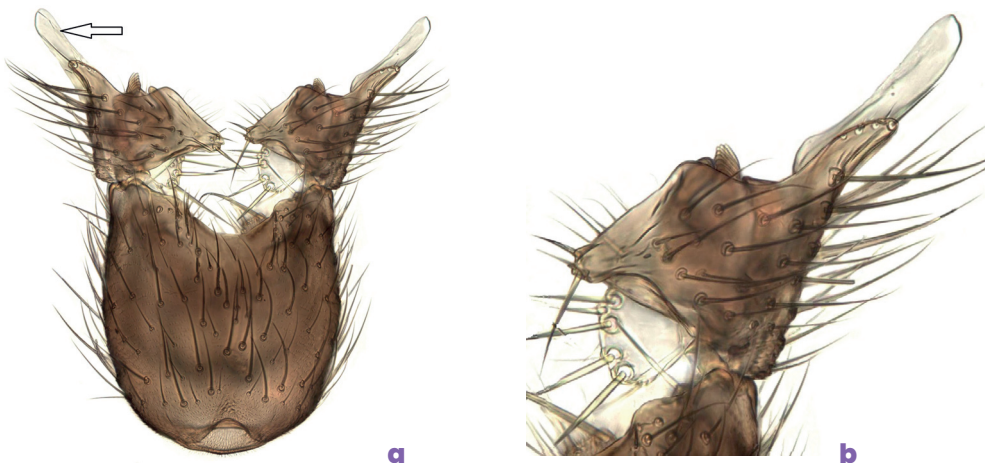


Figure 299. *Phronia disgrega*: (a) ventral view of ♂ genitalia and (b) gonostylus.

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- Gonostylus with ventral lobe without digitate process; bare on basal half but with a broad medial part densely bristled apically (arrowed). Hind femur entirely yellow. [Mesonotum with yellow humeral area; tergites 2-3 narrowly yellow laterally; legs all yellow] *sylvatica* Dziedzicki, 1889 (p. 326)

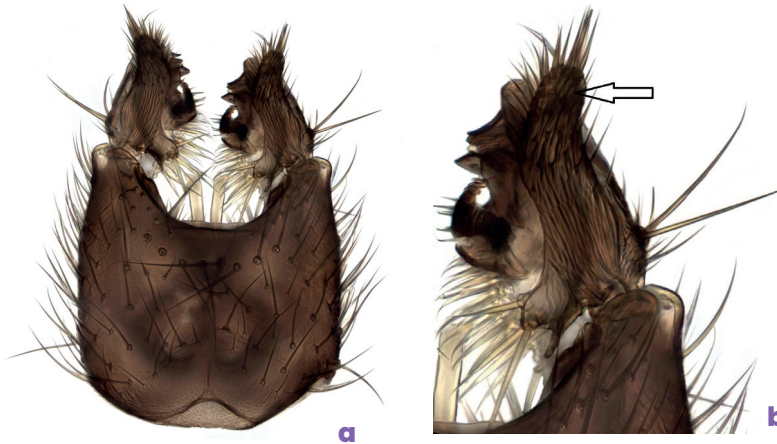


Figure 300. *Phronia sylvatica*: (a) ventral view of ♂ genitalia and (b) gonostylus.

28. Ventral lobe of gonostylus broad without appendages or apical excavation 29
- Ventral lobe of gonostylus with appendages or a distinct apical excavation 34
29. Gonocoxites with apical ventral margin bearing several short strong bristles medially (lower arrow) and slightly indented medially. Gonostylus with ventral lobe irregularly ovate with strong bristles on most of surface but apical margin and adjacent surface (upper arrow) mostly devoid of bristles. [Mesonotum yellow with brown stripes; tergites 2-4 with yellow basal triangles; hind femur dark at tip] *triangularis* Dziedzicki, 1889 (p. 327)
- Gonocoxites without strong bristles medially. Gonostylus with bristles on entire apical margin 30

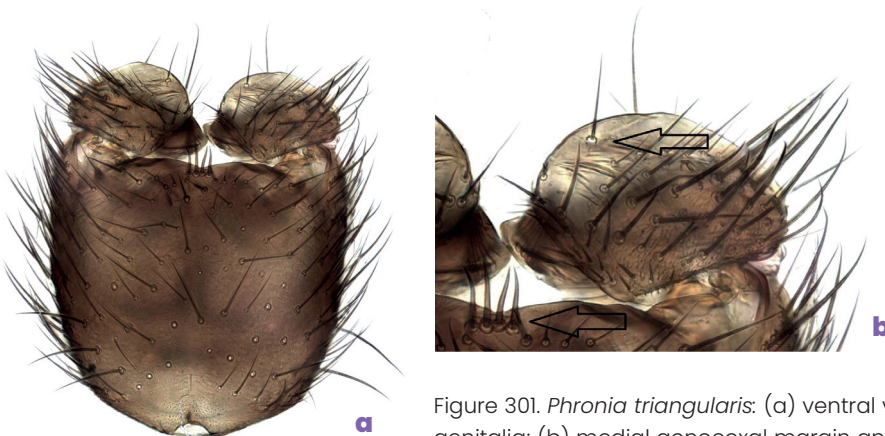


Figure 301. *Phronia triangularis*: (a) ventral view of ♂ genitalia; (b) medial gonocoxal margin and gonostylus.

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30. Gonostylus with ventral lobe as long as wide and densely clothed with fine bristles 31
- Gonostylus with ventral lobe at least twice as wide as long 32
31. Gonostylus with long bristles on apical ventral margin of ventral lobe (arrowed). Gonocoxites with apical ventral margin nearly straight. [Mesonotum yellow with brown stripes; tergites 2-4 yellow basally; hind femur dark at tip] *signata* Winnertz, 1864 (p. 326)
- Gonostylus with only fine setulae on apical ventral margin (arrowed). Gonocoxites with apical ventral margin convex medially. [Mesonotum brown with yellow humeral area; tergite 2 yellow laterally; hind femur dark apically] *elegantula* Hackman, 1970 (p. 323)

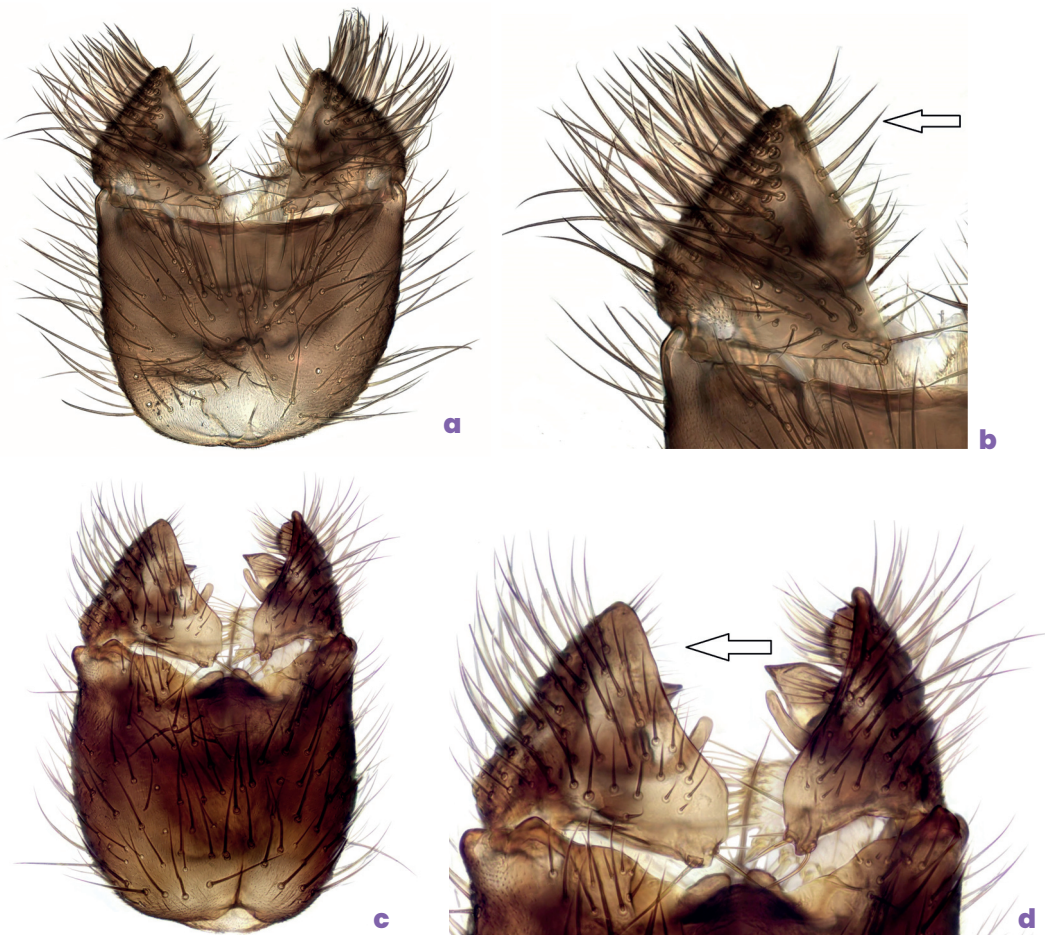


Figure 302. *Phronia signata*: (a) ventral view of ♂ genitalia; (b) gonostylus.
Phronia elegantula: (c) ventral view of ♂ genitalia; (d) gonostyli.

32. Gonocoxites with a shallowly convex medial lobe on apical ventral margin (lower arrow). Gonostylus with ventral lobe bearing a group of spinose bristles on dorsal corner. Aedeagus curved apically in lateral view, bifid on apical half in ventral view (upper arrow). [Mesonotum with yellow humeral area; tergites 2-4 yellow basally; hind coxa and femur dark apically] *mutabilis* Dziedzicki, 1889 (p. 324)
- Gonocoxites not distinctly convex on apical ventral margin 33



Figure 303. *Phronia mutabilis*: (a) ventral view of ♂ genitalia; (b) gonostylus and medial margin of gonocoxites.

33. Gonostylus with short spinose bristles on apical margin (upper arrows). Cercus with only short apical bristles. Aedeagus broadly rounded apically in lateral view, with V-shaped apical excavation in ventral view (arrowed). [Body all dark brown; mid and hind coxa brown; hind femur dark apically] *portschinskyi* Dziedzicki, 1889 (p. 325)
- Gonostylus without spinose bristles. Cercus with one long apical bristle. Aedeagus pointed and straight apically in lateral view, bifid apically in ventral view (arrowed). [Mesonotum yellow with brown stripes; tergites 2-4 yellow basally, triangles on 3 and 4; hind femur with dark tip] *obtusa* Winnertz, 1864 (p. 325)

[*P. taczanowskyi* Dziedzicki, 1889, widespread in central and northern Europe, differs in having 3 long bristles on medial corner of ventral lobe of gonostylus while there are only 2 such bristles, individually arrowed below for *P. obtusa* (the two lower arrows)]

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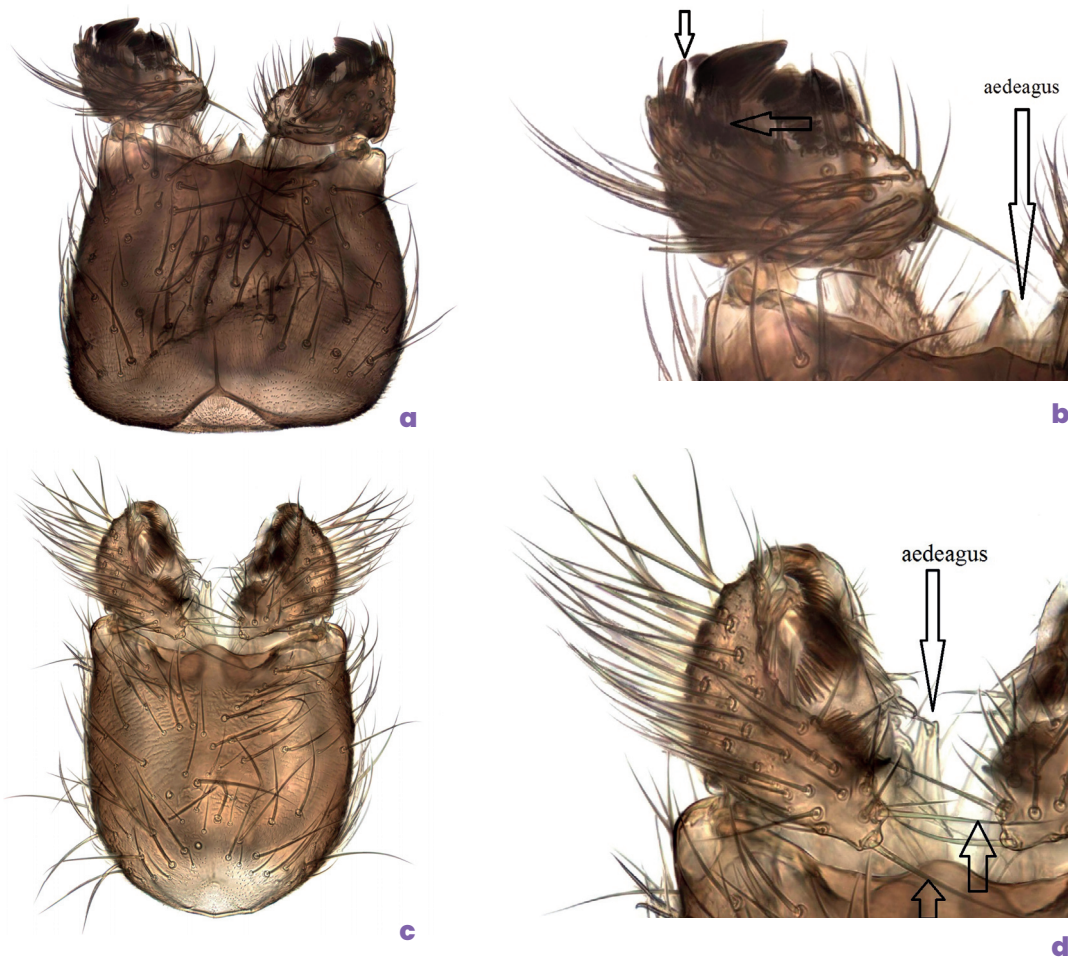


Figure 304. *Phronia portschinskyi*: (a) ventral view ♂ genitalia; (b) gonostylus and margin of gonocoxites. *Phronia obtusa*: (c) ventral view; (d) gonostylus and medial margin of gonocoxites.

34. Ventral lobe of gonostylus narrow dorsolaterally (arrowed) and broadest medially without any excavation. Medial lobe with two corrugations bearing ranks of spinules. Hind femur darkened apically. Wing with dark tip and dark marking behind posterior fork (sometimes faint) in male, female has the latter marking extended across the wing as a continuous median band [also in male in Atlantic Islands populations]. [Mesonotum yellow with brown stripes; tergites 1-3 mainly yellow; mid and hind coxae dark] *biarcuata* (Becker, 1908) (p. 321)
- Ventral lobe of gonostylus deeply divided apically with two or more branches. Wing unmarked 35

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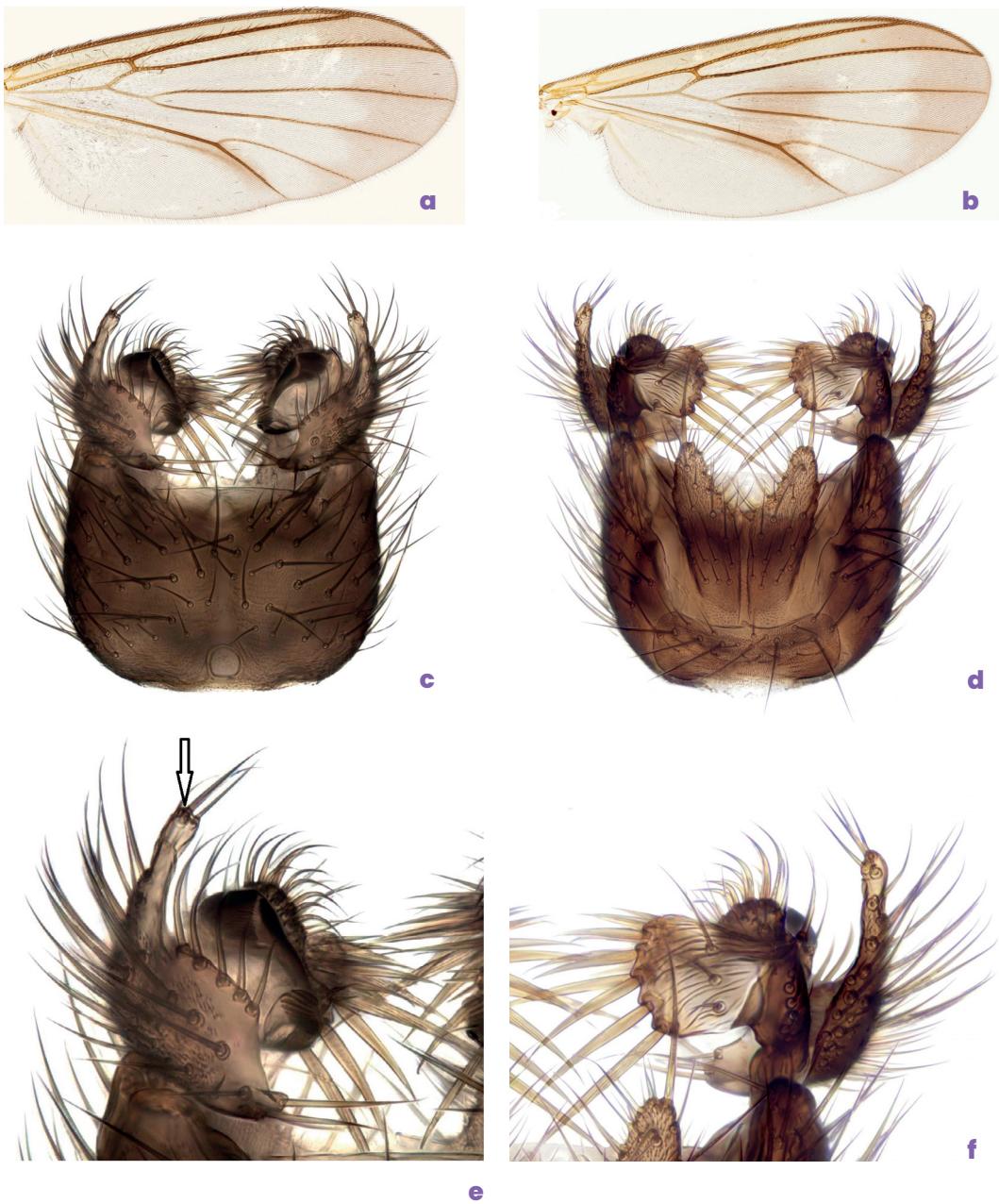


Figure 305. Wing of: (a) *Phronia biarcuata* ♂; (b) *Phronia biarcuata* ♀; (c) ventral and (d) dorsal view of ♂ genitalia; (e) ventral and (f) dorsal view of gonostylus.

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35. Ventral lobe of gonostylus bilobed with broader medial branch longer and bearing three long bristles near basoventral angle (arrowed). Gonocoxites with undulating apical ventral margin with irregular group of long bristles medially. Hind femur broadly dark at tip. [Mesonotum yellow with fused brown stripes; tergites 2–3 mostly yellow, narrowly dark dorsally] *strenua* Winnertz, 1864 (p. 326)
- Ventral lobe of gonostylus comprising four variously shaped branches, bearing two long bristles near basoventral angle, including a long slender lateral lobe (arrowed) which bears a row of bristles on its entire length. Gonocoxites without long bristles medially. Hind femur almost entirely yellow. [Mesonotum yellow with brown stripes; tergites 2–4 all dark or more or less yellow basally; legs all yellow] *interstincta* Dziedzicki, 1889 (p. 324)

[*P. willistoni* Dziedzicki, 1889, a widespread European species, similarly has the ventral lobe of the gonostylus with four branches but the longer lateral branch is only a little longer than other branches and is bristly only on the apical half rather than on the entire length as in *P. interstincta*]

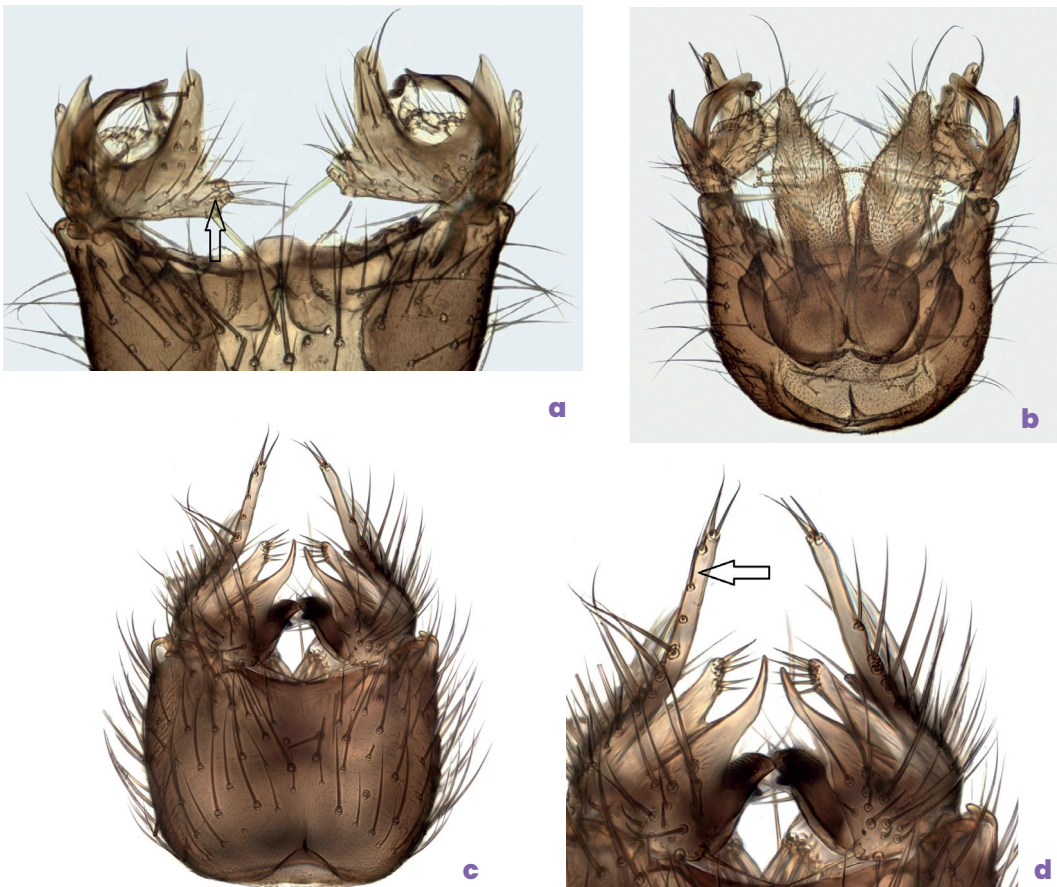


Figure 306. *Phronia strenua*: (a) ventral and (b) dorsal view of ♂ genitalia. *Phronia interstincta*: (c) ventral view of ♂ genitalia and (d) gonostyli.

Species notes

Phronia basalis Winnertz, 1864

Distribution. Common throughout Britain; Irish records are concentrated near the east coast. Widespread in Europe, also in N Africa.

Habitat. Woodland, especially near streams.

Biology. Unknown.

Phronia biarcuata (Becker, 1908)

Distribution. Common throughout Britain and Ireland, also in Isle of Man. Palearctic, widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. All types of woodland.

Biology. **No British records.** **Other records:** case-bearing larvae live on the surface of wood-encrusting fungi (Steenberg 1924, Denmark). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Phronia bicolor Dziedzicki, 1889

Distribution. The only British record is from Kinchordy conifer woods, near Boat of Garten (2.vi.2014; Chandler 2015a), where one male was found among numerous individuals of the similar species *P. coritanica*. Holarctic, widespread in Europe, and no obvious reason why it should not have been recognised in Britain before, other than resemblance to *P. coritanica*.

Habitat. Woodland.

Biology. Unknown.

Phronia braueri Dziedzicki, 1889

Distribution. Common throughout Britain; widespread in Ireland. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. **British records:** slug-like larvae bearing a thick coat of black slime, on wood-encrusting fungi (Edwards 1925, Madwar 1937), reared from the saproxylic agaric *Pluteus salicinus* by R.E. Evans (Chandler 1993b). **Other records:** Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Phronia caliginosa Dziedzicki, 1889

Distribution. Only known from 10 sites within 8 hectads in the Scottish Highlands, but these include Rannoch, the Spey valley, Braemar and Beinn Eighe. The earliest record was 1984 and it remains little known, but 5 hectads include post-2000 records. Holarctic, widespread in Europe.

Habitat. Caledonian pine forest, mostly near streams.

Biology. Unknown.

***Phronia cinerascens* Winnertz, 1864**

Distribution. Common throughout Britain; widespread in Ireland. Holarctic, widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. Unknown.

***Phronia conformis* (Walker, 1856)**

Distribution. Common throughout Britain and Ireland, also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. British records: larvae in thin white mucilage on the surface of wood-encrusting fungi (Edwards 1925).

***Phronia coritanica* Chandler, 1992**

Distribution. Common throughout Britain; widespread in the central part of Ireland, also in Jersey. Widespread in Europe.

Habitat. Woodland.

Biology. British records: larvae in thin white mucilage on surface of wood-encrusting fungi (Edwards 1925, as *P. tarsata*).

***Phronia disgrega* Dziedzicki, 1889**

Distribution. Widespread in S England as far as the Welsh borders, then one record from N England (Higswood, 1980) and again widespread (10 hectads) in the central Scottish Highlands. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Phronia egregia* Dziedzicki, 1889**

Distribution. Widespread throughout Britain, with scattered records; first recognised in Britain in 1975 and there has been a steady increase in records since. Two records from N Ireland (Glendun, Co Antrim, 8.xi.1980, Chandler; Belvoir Park Forest, Co Down, 2.x.2019, R. Mitchell), also in Isle of Man. Holarctic, widespread in Europe.

Habitat. Damp woodland and wetlands.

Biology. Unknown.

***Phronia electa* Dziedzicki, 1889**

Distribution. Widely scattered in Britain and most frequent in the Scottish Highlands (9 hectads); further south it is mainly western (10 hectads in England, 3 in Wales) with only two sites nationally (White Down, Surrey, 2008; Warburg Reserve, Oxfordshire, 2016) to the east of the New Forest. Palaearctic, widespread in Europe.

Habitat. Damp broad-leaved woodland.

Biology. Unknown.

***Phronia elegantula* Hackman, 1970**

Distribution. Found at two sites within the same hectad in Argyll, Scotland: Inverliever Forest near Loch Awe on 1 June 2018 and Newyork near Dalavarich on 7 June 2019 (R. Morris; Chandler 2020). Otherwise known from Germany and the Nordic region.

Habitat. Woodland.

Biology. Unknown.

***Phronia exigua* (Zetterstedt, 1852)**

Distribution. Common throughout Britain; two Irish records (Glendalough, Co Wicklow; Muckross Abbey woods, Co Kerry, 1973), also in Isle of Man. Holarctic, widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. Unknown.

***Phronia flavipes* Winnertz, 1864**

Distribution. Common throughout Britain; a few scattered Irish records. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Phronia forcipata* Winnertz, 1864**

Distribution. Common throughout Britain; widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Phronia forcipula* Winnertz, 1864**

Distribution. All records are recent; possibly a recent arrival in Britain, although it could have been confused with *P. humeralis*. First found at Langley Park, Bucks in 2007, though first identified from Wortley Top Forge, Yorks (2009) (Chandler and Perry 2011), which is still the most northerly record; in 2011, it was found at Bushy Park, Middlesex and Burton Mill Pond, Sussex, so it already had a wide area of occurrence, now records from 15 hectads. Holarctic, widespread in Europe.

Habitat. Broad-leaved woodland and parkland.

Biology. Unknown. Zaitzev (2003) referred to Edwards' record, which related to *P. humeralis*.

***Phronia humeralis* Winnertz, 1864**

Distribution. Common throughout Britain and Ireland, also in Guernsey and Jersey. Palaearctic, widespread in Europe.

Habitat. Woodland, most abundant in damp areas and near streams.

Biology. **British records:** "*Corticium*" sp. (? *Peniophorella praetermissa*) (Buxton 1960), *C. sp.*,

whitish non case-bearing larvae on the surface of wood-encrusting fungi (Edwards 1925). **Other records:** *Chondrostereum purpureum* on heaps of fallen birch twigs (Jakovlev 2011, Finland).

***Phronia interstincta* Dziedzicki, 1889**

Distribution. Frequent in the Scottish Highlands (22 hectads), where it is present in all the main regions, but with only a few scattered records (6 hectads) further south, in Galloway, Cumbria, Yorks, N Wales and Devon. Holarctic, widespread in Europe.

Habitat. Mainly broad-leaved woodland, with some Caledonian pine forest sites.

Biology. Unknown.

***Phronia longelamellata* Strobl, 1898**

Distribution. One male was found at Walberswick NNR, Suffolk on 29 April 2017, by Ivan Perry (Chandler 2018a). Palaeartic, widespread in Europe, extending from France through central Europe to Scandinavia and northern Russia.

Habitat. Woodland.

Biology. Unknown.

***Phronia mutabilis* Dziedzicki, 1889**

Distribution. Frequent in the Scottish Highlands (22 hectads), where it is present in all the main regions; scattered records further south include two in N England, some wetland sites in Wales and East Anglia, and only one record in S England (Savernake Forest, Wilts). Holarctic, widespread in Europe.

Habitat. Broad-leaved woodland, Caledonian pine forest, wet heathland and some wetland habitats, such as fens.

Biology. Unknown.

***Phronia nigricornis* (Zetterstedt, 1852)**

Distribution. Common throughout Britain; widespread in Ireland. Holarctic, widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Phronia nitidiventris* (van der Wulp, 1859)**

Distribution. Common throughout Britain; widespread in Ireland. Palaeartic, widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. Woodland.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Phronia notata* Dziedzicki, 1889**

Distribution. Common throughout Britain; widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Phronia obtusa* Winnertz, 1864**

Distribution. Frequent throughout Britain; one Irish record (Enniskerry, Co Wicklow, 10.xi.1986, Chandler). Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Phronia persimilis* Hackman, 1970**

Distribution. A poorly known species, which may be overlooked. The few British records are widely scattered, two in England (Mains Wood, Herefordshire, 23.viii.1973; Buckingham Thick Copse, Northants, 1992) and six in Scotland (Craigellachie in the Spey valley, 29.vi.1967; Dundreggan in Glen Moriston, 23.vii.2012; Drimsynie, 29.v.2018, Glen Tarbert, 6.vi.2018 and Gleann Geal, 7.vi.2018, Argyll; Loch Arkaig, vii–viii.2018). Holarctic, widespread in Europe.

Habitat. Damp broad-leaved woodland.

Biology. Unknown.

***Phronia petulans* Dziedzicki, 1889**

Distribution. Only known in Britain from two sites: Nesbitt Dene, Durham (23.vii.1990, Chandler) and Chippenham Fen, Cambs (24.x and 17.xi.2018, I. Perry). Holarctic, widespread in Europe.

Habitat. Nesbitt Dene is broad-leaved woodland fringing a limestone stream, bordered by conifer plantations; the stream was dry but providing shelter for many fungus gnats at the time of discovery. The habitat at Chippenham Fen is partially wooded fenland.

Biology. Unknown.

***Phronia portschinskyi* Dziedzicki, 1889**

Distribution. Most British records are from wetlands in Wales and East Anglia, mostly from surveys in 1988 to 1990; altogether 11 hectads, 4 of them post-2000. More recent records are from Oxwich Burrows, Glamorgan (9.ix.1996, I. Perry); Minsmere, Suffolk (18.x.1996, I. McLean); Woodbastwick, Norfolk (14.vi.2011, C.M. Drake); Flitwick Moor, Beds (regularly 2013–2017, I. Perry); Chippenham Fen, Cambs (29.x.2016, I. Perry); Thundery Meadows, Surrey (23.ix.2017, M. Mitchell). Holarctic, widespread in Europe.

Habitat. Wetlands, including fen and carr; the Oxwich Burrows site was presumably a dune slack.

Biology. Unknown.

***Phronia siebeckii* Dziedzicki, 1889**

Distribution. Frequent throughout Britain. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. The larvae develop in soft fungi. **British records:** *Calocera viscosa*, larvae bright yellow from ingested fungus tissue (Buxton 1960). **Other records:** also *C. viscosa* (Ševčík 2006), *Tremella foliacea* on fallen birch (Jakovlev 2011).

***Phronia signata* Winnertz, 1864**

Distribution. Common in Scotland including the west coast and islands, widespread elsewhere in Britain with a south-western bias, extending across S England and common in the Weald; widespread in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland and heathland.

Biology. Unknown.

***Phronia strenua* Winnertz, 1864**

Distribution. Common throughout Britain; several records from the northern half of Ireland. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. **British records:** larvae bearing fairly hard conical limpet-like black cases on encrusting fungi on fallen branches; on removal from these they began to construct new ones from their excrement but these were not quite so regular (Edwards 1925, Madwar 1937). **Other records:** case-bearing larvae on wood-encrusting fungi (Steenberg 1924, Denmark); reared from moulds on decayed slash residues of birch (Jakovlev 2011, Finland).

***Phronia sudetica* Dziedzicki, 1889**

Distribution. Widely scattered records in Britain; it was first found in Cumbria (Brigsteer Wood, 1978), though first recognised in N Wales in 1987. There are records from 15 hectads, mostly western (2 in Scotland, 4 in Wales); of 9 in England two are in the New Forest, and only two further east, in Northants (Buckingham Thick Copse, Yardley Chase). Chandler (2018b) recorded it from Ireland (Breen Wood, Co Antrim, viii-x.2017, A. Mantell). Holarctic, widespread in Europe.

Habitat. Broad-leaved woodland, especially near streams.

Biology. Unknown.

***Phronia sylvatica* Dziedzicki, 1889**

Distribution. Till recently only known in Britain from a single male found at Loch Tromlee, Argyll (11.vi.1976, A. Stubbs), then found at a second Scottish site, Strath Rory, E Ross (13.vi.2016, I. Perry) and at two sites in Windsor Forest and Great Park, Berks (20.vii.2017, 10.v.2018, Chandler). Holarctic, widespread in Europe.

Habitat. The Scottish sites are respectively open moorland and by an upland stream fringed with willows. The Windsor records were along dry but humid streambeds in woodland.

Biology. Unknown.

***Phronia tenuis* Winnertz, 1864**

Distribution. Common throughout Britain and Ireland, also in Isle of Man. Holarctic, widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. **British records:** larvae in thin white mucilage on wood-encrusting fungi (Edwards 1925, larvae similar to "*P. tarsata*", i.e. *P. coritanica*). **Other records:** Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Phronia tiefii* Dziedzicki, 1889**

Distribution. Only known from three sites in the Spey valley, Scotland (Loch an Eilein and Rothiemurchus, both 15.ix.2004, I. Perry, Chandler 2006; Nethy Bridge, ix-x.2011, M. Townsend). Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Phronia triangularis* Winnertz, 1864**

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man. Widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Phronia vitrea* Plassmann, 1999**

Distribution. Uncommon but widespread in the Scottish Highlands (first recorded only in 1982), with records (13 hectads) from Argyll, Rannoch, the Spey and Findhorn valleys, E and W Ross and Sutherland, as well as one record from Cumbria (Swindale Beck, Brough 1985). Widespread in C and N Europe.

Habitat. Both broad-leaved woodland (oak, beech and birch) and in Caledonian pine forest.

Biology. Unknown.

Genus *Platurocypta* Enderlein

Resembling *Mycetophila* but differing in thoracic structure and with the costa distinctly produced beyond the tip of vein R_{4+5} . Body shining brown to black, all dark or with some lighter markings, and wings marked with a central spot and apical shade. Legs yellow with apex and dorsal margin of hind femur dark; mid and hind coxae may also be darkened. Mesonotum with distinct humeral indentation level with prothoracic spiracle, providing a 90 degree or less angle in side margin of mesonotum (less marked than in *Epicypta*). Anepisternum and katepisternum distinctly longer than broad. Laterotergite and anepimeron small and narrow, more horizontal in position than in *Mycetophila* and anepimeron not narrowed below. Prothorax as in *Mycetophila* with pronotal lobes distinctly separated from proepisternum (in contrast to *Epicypta*) and bearing irregular

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series of distinct long bristles dorsally. Two pairs of strong scutellars, 3 proepisternals. Vein Sc ends free. All veins setulose including bm-m. Vein M₄ parallel with M₂ throughout (slight divergence apically) and slightly divergent from CuA. Second abdominal segment without ventral bristles (in contrast to *Epicypta*). Mid and hind tibiae with series of strong anterior and dorsal bristles, mid tibia also with strong ventral bristles. Hind tibial spurs as long as tarsomere I. Wing length 3.0–3.5 mm.

Male genitalia with gonostylus comprising two articulating lobes, the dorsal and ventral stylomeres separate (as in *Mycetophila*). Female cercus two-segmented.

There are 2 European species, both found in Britain and both included in the key by Zaitzev (2003). Both British species have the hind femur dark dorsally (as in some *Mycetophila* species including the *M. vittipes* Group, of which *M. vittipes*, like *Platurocypta* species, develops in myxomycetes), and both species may have the coxae entirely yellow or the mid and hind coxae mainly dark brown.

Key to *Platurocypta* Enderlein

1. Body black. Wing without strong dark markings, only r-m and anterior wing margin slightly darkened. Female fore tarsus slender *punctum* (Stannius, 1831) (p. 329)
- Body mainly dark brown; mesonotum with yellow humeral areas. Wing with distinct central spot and dark shade on anterior margin apically. Female fore tarsus enlarged *testata* (Edwards, 1925) (p. 329)

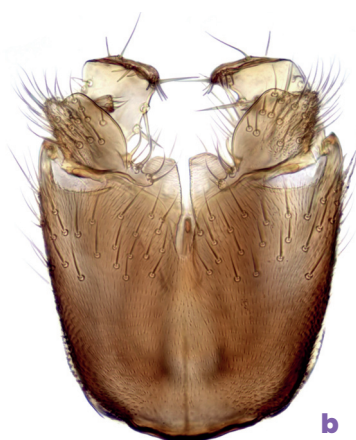


Figure 307. *Platurocypta punctum*: (a) wing; (b) ventral and (c) dorsal view of ♂ genitalia.

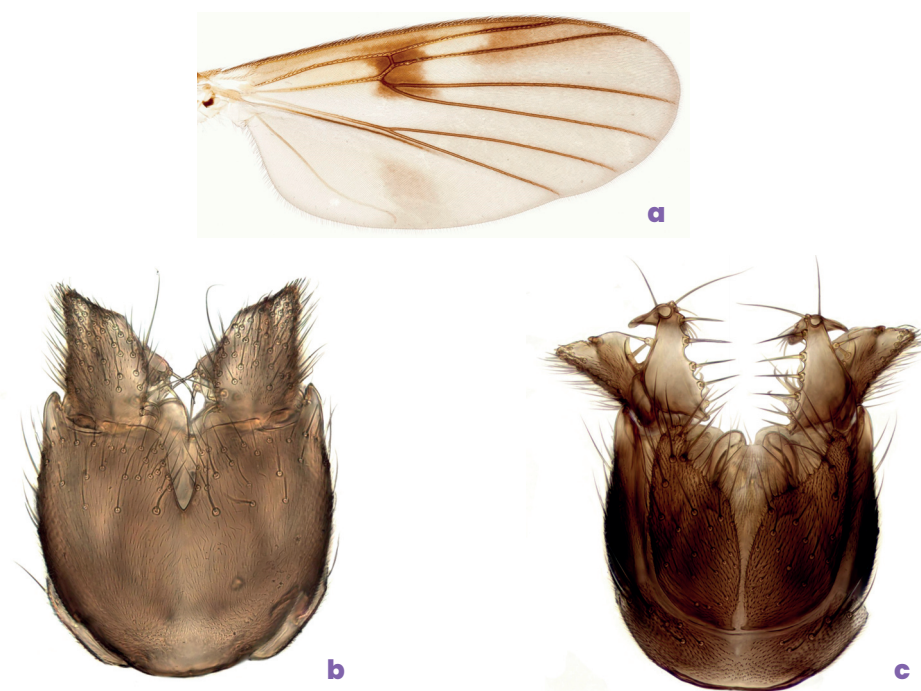


Figure 308. *Platurocypta testata*: (a) wing; (b) ventral and (c) dorsal view of ♂ genitalia.

Species notes

Platurocypta punctum (Stannius, 1831)

Distribution. Common throughout Britain; widespread in Ireland, also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. It develops in myxomycetes. **British records:** *Lycogala epidendrum* (Buxton 1954), *Reticularia* sp. (Chandler 1978b). **Other records:** *Tubifera ferruginosa* (Kinel and Noskiewicz 1931). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Platurocypta testata (Edwards, 1924)

Distribution. Common throughout Britain; widespread in Ireland, also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. It develops in myxomycetes. **British records:** *Lycogala epidendrum*, *Tubifera ferruginosa* (Chandler 1993b), *Reticularia lycoperdon* (Buxton 1954), *Tubifera ferruginosa* (R. Fortey; Fortey and Chandler 2021). **Other records:** *Tubifera ferruginosa* (Kinel and Noskiewicz 1931), *Lycogala epidendrum*, *Reticularia lycoperdon*, *Fuligo septica* (Laštovka 1972a; Ševčík 2006, 2010). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

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Genus *Sceptonia* Winnertz

Small mainly dark coloured gnats, sometimes with lighter humeral area and/or yellow markings on abdominal tergites 1–3, and with clear or slightly smoky wings; legs yellow with hind femur broadly dark apically, or more generally darkened (*S. fumipes*). Mesonotum shining and finely pitted, clothed with dense decumbent setulae. Anepisternum with similar bristling to mesonotum, longer than broad; katepisternum smaller. Anepimeron reduced but with strong bristles present. Laterotergite also reduced, not strongly projecting. Two pairs of scutellars, 3–4 proepisternals. Stem of median fork a little longer than r-m. Posterior fork absent (vein CuA unforked to wing margin). Veins M_2 and CuA parallel. Veins of median fork and CuA bare. Mid and hind tibiae with anterior and dorsal series of strong bristles. Mid tibia with ventral bristles weak or absent. Hind tibia with series of strong anterior and dorsal bristles; short decumbent posterior bristles along its length. Wing length 2.0–2.5 mm.

Male genitalia as in *Mycetophila* with gonostylus comprising two articulating lobes, the dorsal and ventral stylomeres. Cerci usually fused basally. Female cercus two-segmented.

The species of this genus fall into two groups according to the wing venation (*nigra* Group – species in couplets 2 to 6 of the key; and *concolor* Group – other species), within which identification relies mainly on the male genitalia and females cannot be reliably determined. There are 18 European species, of which 13 are recorded from Britain including all of the 10 species keyed by Zaitzev (2003). Bechev (1993) keyed the Palearctic species.



Figure 309. (a) *Sceptonia nigra* ♂.
(b) *Sceptonia costata* ♂.

Key to *Sceptonia* Winnertz

1. Gonocoxites with a fringe of long bristles near ventral apical margin (arrowed) *longisetosa* Ševčík, 2004 (p. 339)
- Gonocoxites without such a fringe 2



Figure 310. *Sceptonia longisetosa*: (a) ventral view of ♂ genitalia; (b) aedeagus; (c) dorsal view (tergite and aedeagus removed).

2. Radial veins close to costa and R_{4+5} (arrowed in figure of *S. costata*) little more than its width removed from R_1 3
- Radial veins more distant from costa and R_{4+5} (arrowed in figure of *S. fumipes*) about 2-3 x its width removed from R_1 7



Figure 311. Wing of: (a) *Sceptonia costata*; (b) *Sceptonia fumipes*

3. Mesonotum with distinct yellow humeral area. Ventral lobe of gonostylus with irregular bristles apically and spinose bristles on a medial protuberance (arrowed in figure of gonostylus) *humarella* Edwards, 1941 (p. 339)
- Mesonotum shining black without pale humeral area. Ventral lobe of gonostylus with a discrete group of long bristles on an otherwise bare surface 4

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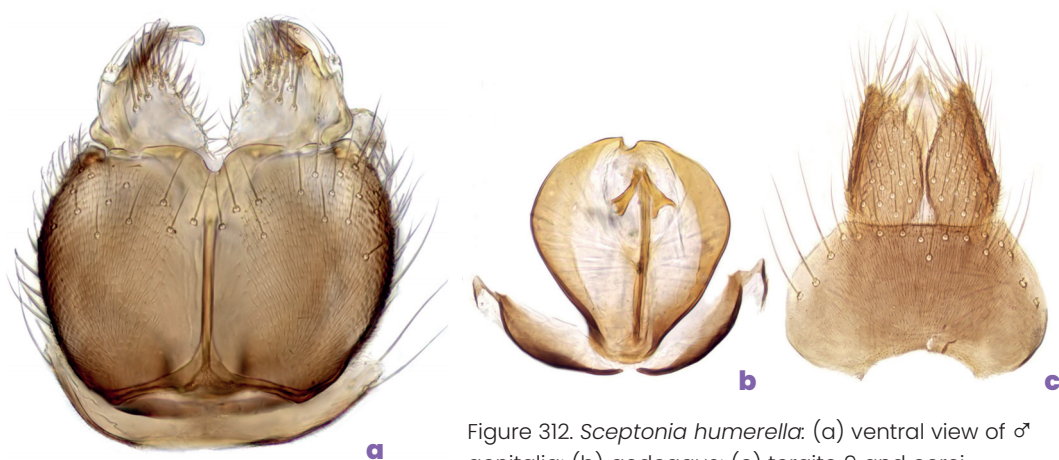


Figure 312. *Sceptonia humerella*: (a) ventral view of ♂ genitalia; (b) aedeagus; (c) tergite 9 and cerci.

4. Ventral lobe of gonostylus with tuft of long bristles on inner corner of apical margin (arrowed in figure of gonostylus). Abdomen with yellow markings at junctions of tergites 1/2, 2/3 and 3/4. Hind coxa usually broadly dark basally *costata* (van der Wulp, 1858) (p. 338)
- Ventral lobe of gonostylus with tuft of long bristles on ventral surface, which are directed medially (left arrow in ventral view of gonostylus for each species) 5

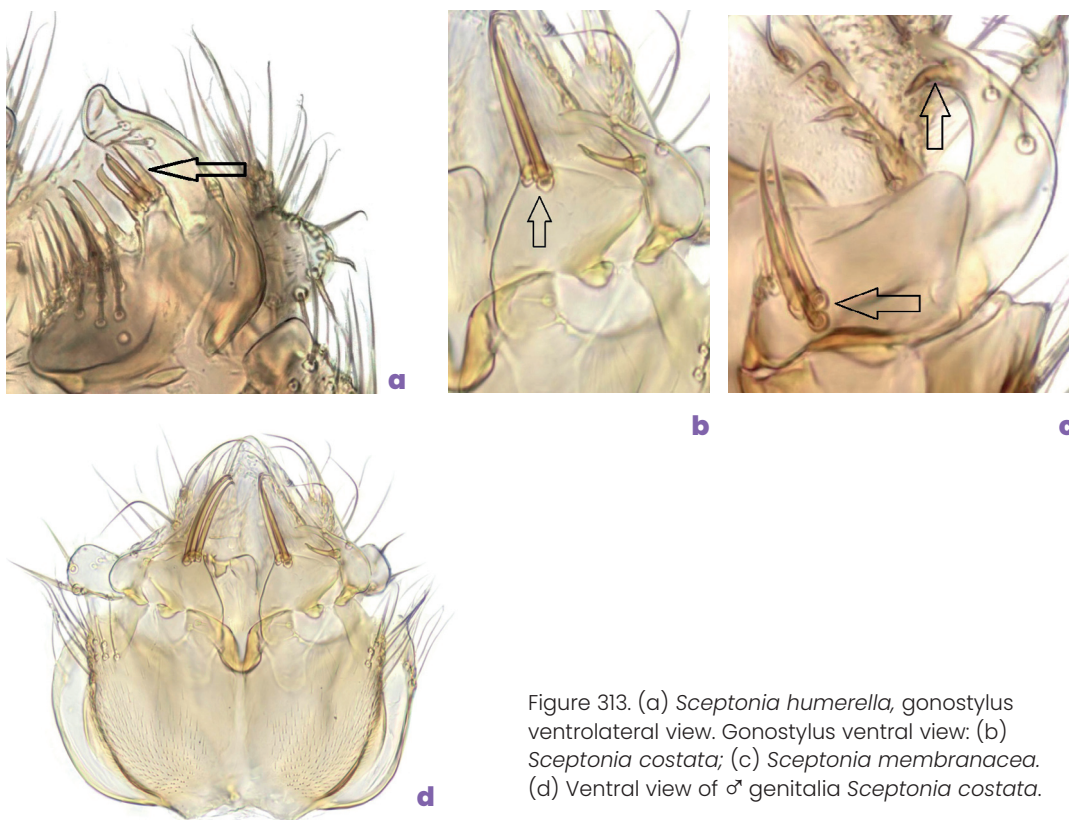


Figure 313. (a) *Sceptonia humerella*, gonostylus ventrolateral view. Gonostylus ventral view: (b) *Sceptonia costata*; (c) *Sceptonia membranacea*. (d) Ventral view of ♂ genitalia *Sceptonia costata*.

5. Dorsal lobe of gonostylus slender with a short spinose preapical bristle (upper arrow in figure of gonostylus). Body usually entirely shining black and legs with narrow dark base to hind coxa *membranacea* Edwards, 1925 (p. 339)
- Dorsal lobe of gonostylus with a strong spinose bristle situated medially (right arrow in figures of gonostylus for each species) 6
6. Dorsal lobe of gonostylus with sharply reflexed blunt apical portion (arrowed in ventral view). Body usually entirely shining black (sometimes small yellow lateral markings on tergites) and legs with narrow dark base to hind coxa
..... *nigra* (Meigen, 1804) (p. 339)
- Dorsal lobe of gonostylus with apical portion curved and pointed apically. Thorax shining black but abdomen with yellow lateral markings on tergites (similar to *S. costata*); legs with more or less narrow dark base to hind coxa *cryptocauda* Chandler, 1991 (p. 338)

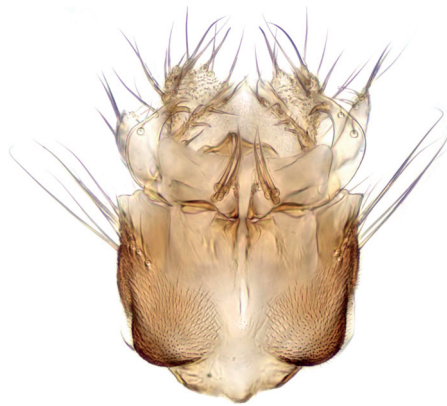


Figure 314. Ventral view of ♂ genitalia
Sceptonia membranacea.

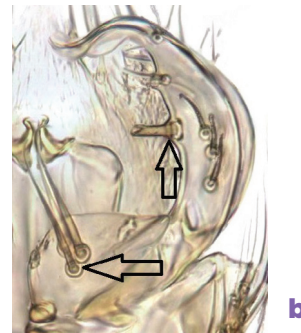
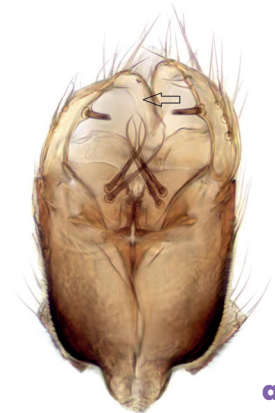
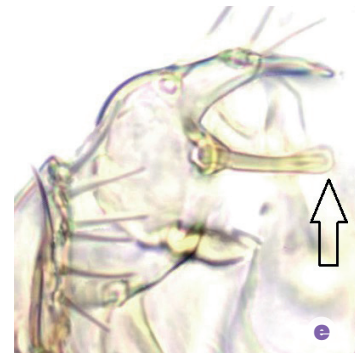
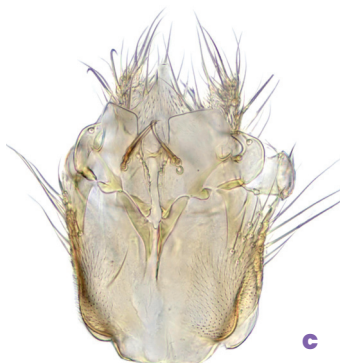


Figure 315. *Sceptonia nigra*: (a) ventral view of ♂ genitalia,
(b) gonostylus ventral view.
Sceptonia cryptocauda: (c) ventral view of ♂ genitalia,
(d) gonostylus ventral and (e) dorsal view of dorsal lobe.



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7. Tergite 9 strongly narrowed apically (to less than half its basal width) and subequal in length to cerci. Mesonotum with yellow humeral area ... *flavipuncta* Edwards, 1925 (p. 338)
- Tergite 9 not strongly narrowed apically. Mesonotum without yellow humeral area 8

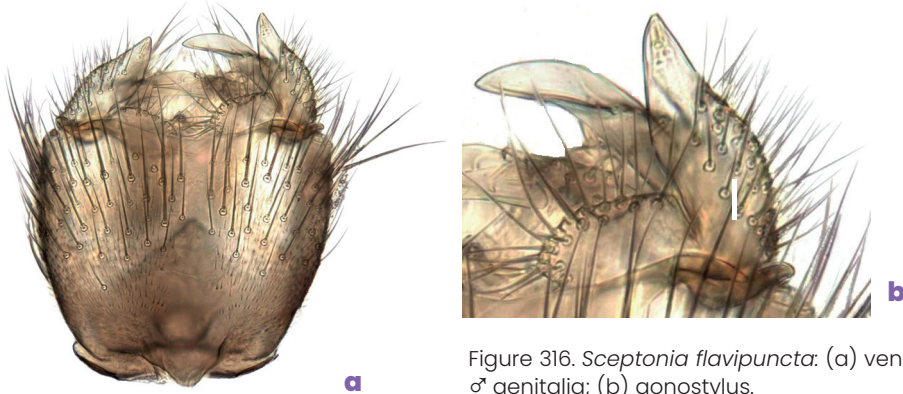


Figure 316. *Sceptonia flavipuncta*: (a) ventral view of ♂ genitalia; (b) gonostylus.

8. Tergite 9 subequal to or shorter than cerci (as in figure of *S. regni*) 9
- Tergite 9 more than twice as long as cerci (as in figure of *S. fuscipalpis*) 12
9. Ventral lobe of gonostylus with an apical excavation 10
- Ventral lobe of gonostylus without an apical excavation 11
10. Ventral lobe of gonostylus with a shallow excavation (upper arrow in ventral view of gonostylus) and a basally narrow medial lobe (lower arrow), with dense bristling apically. Usually with legs extensively darkened, but may be yellow except for apical half of hind femur *fumipes* Edwards, 1925 (p. 338)
- Ventral lobe of gonostylus with a deeper excavation (to about half its length; upper arrow in ventral view of gonostylus) and apically tapered medially without distinct lobe (lower arrow). Legs yellow except for apex of hind femur *tenuis* Edwards, 1925 (p. 340)



Figure 317. Ventral views of ♂ genitalia: (a) *Sceptonia fumipes*; (b) *Sceptonia tenuis*. (Gonostylus see Fig. 318)

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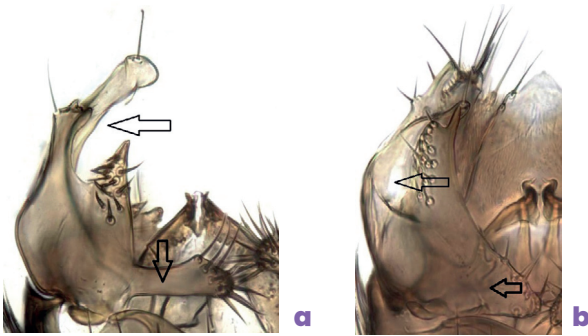


Figure 318. Gonostylus ventral view of: (a) *Sceptonia fumipes*; (b) *Sceptonia tenuis*.

11. Ventral lobe of gonostylus tapered apically and triangular in ventral view (arrowed in figure of gonostylus)
*concolor* Winnertz, 1864 (p. 338)
- Ventral lobe of gonostylus blunter apically and more rectangular in ventral view (arrowed in ventral view)
 *regni* Chandler, 1991 (p. 340)

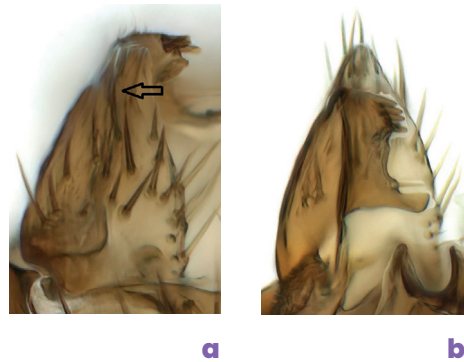


Figure 319. *Sceptonia concolor*: (a) ventral and (b) dorsal view of gonostylus; (c) ventral and (d) dorsal view of ♂ genitalia (tergite 9 and cerci removed). *Sceptonia regni*: (e) ventral view of ♂ genitalia; (f) tergite 9 and cerci; (g) aedeagus; (h) gonostylus internal view.

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12. Ventral lobe of gonostylus without an apical excavation, but narrowed on apical half (upper arrow in figure of gonostyli). Gonocoxites with an angular medial cleft (lower arrow in figure of gonostyli) *pughi* Chandler, 1991 (p. 340)
- Ventral lobe of gonostylus with an apical excavation. Gonocoxites with a broad shallow apical excavation 13



Figure 320. *Sceptonia pughi*. (a) ventral view of ♂ genitalia; (b) gonostyli ventral view.

13. Ventral lobe of gonostylus with only a shallow apical excavation (arrowed in figure of gonostylus) *fuscipalpis* Edwards, 1925 (p. 339)
- Ventral lobe of gonostylus with a deep excavation (arrowed in figure of gonostylus) *pilosa* Bukowski, 1934 (p. 340)

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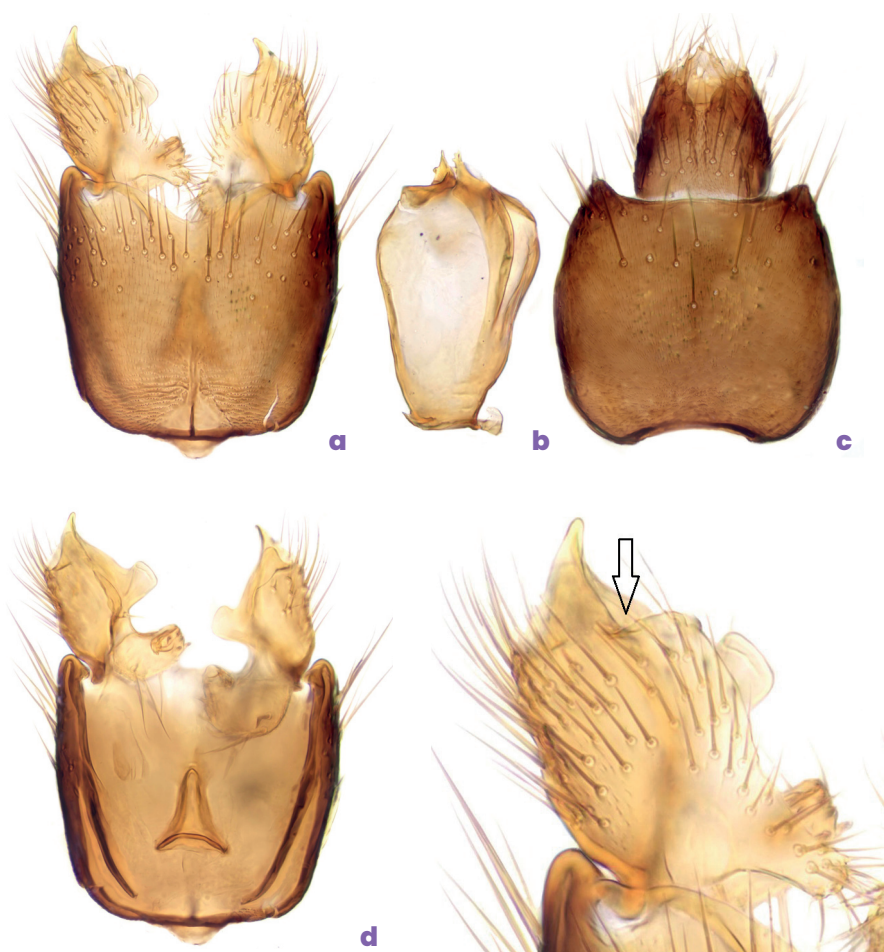


Figure 321. *Sceptonia fuscipalpis*: (a) ventral view of σ genitalia; (b) aedeagus; (c) tergite 9 and cerci; (d) dorsal view without tergite; (e) gonostylus.

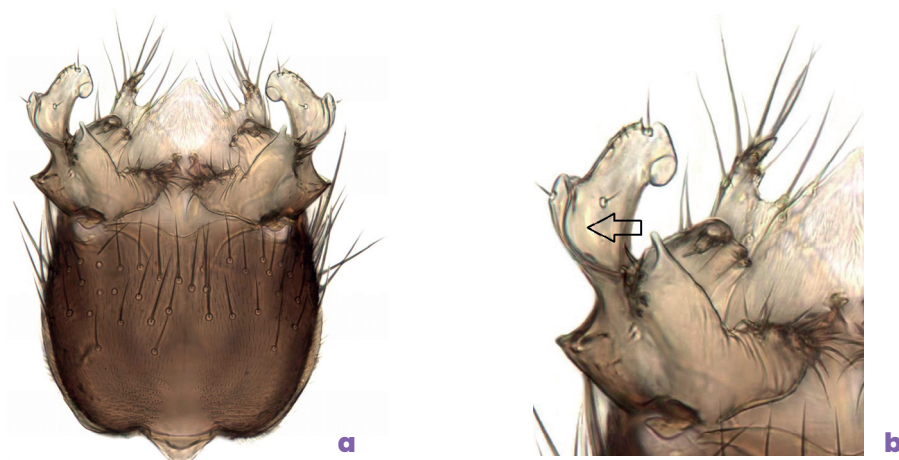


Figure 322. *Sceptonia pilosa*: (a) ventral view of σ genitalia; (b) gonostylus.

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Species notes

Sceptonia concolor Winnertz, 1864

Distribution. A poorly-known species with records (6 hectads) only from the first half of the 20th century (1900–1939), including several from both N Scotland (Dingwall, Logie, Forres, Grantown-on-Spey) and S England (New Forest, Hampshire; Crowborough, Sussex; Open Brasenose Common, Oxfordshire). Widespread in Europe.

Habitat. Known sites are wooded, but there is little precise information on habitats.

Biology. Unknown.

Sceptonia costata (van der Wulp, 1859)

Distribution. Frequent through most of Britain, but with a gap in records between N Yorkshire and the Scottish Highlands; a few scattered records in Ireland. Palaearctic, widespread in Europe.

Habitat. Woodland. Adults occur on tree foliage like some other species of the genus.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Sceptonia cryptocauda Chandler, 1991

Distribution. Frequent in most of England, with a few Welsh records (Powis Castle, Dinefwr and Llanover Parks), two from Scotland (Lynachlaggan in the Spey valley, 1997; Linn Mill, 2019) and one from Ireland (Lough Key Forest Park, Co Roscommon, 28.ix.1977), also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland. Adults occur on tree foliage.

Biology. Unknown.

Sceptonia flavipuncta Edwards, 1925

Distribution. Widespread in S England (39 hectads) and S Wales (4 hectads), north to Derbyshire and Lincs, with a recent increase in records including one from Scotland (Allean Forest, 21.vi.2019, R. Morris); a few scattered records (3 hectads) in Ireland. Widespread in Europe.

Habitat. Woodland. Adults occur on tree foliage.

Biology. **No British records. Other records:** reared from the terrestrial agaric *Clitopilus geminus* (Ševčík 2010, noting that it was the first confirmed fungus association for this genus).

Sceptonia fumipes Edwards, 1925

Distribution. Common throughout Britain; widespread in Ireland, also in Jersey. Widespread in Europe.

Habitat. Woodland. Adults occur on tree foliage.

Biology. Unknown.

***Sceptonia fuscipalpis* Edwards, 1925**

Distribution. Scattered records in S England (4 hectads), two from Wales and several (4 hectads) from the eastern part of the Scottish Highlands; most records are old with the most recent being the Welsh records (Black Cliff, 9.vii.1986; Coed Dolgarrog, 6.vii.1987: Chandler & A. Stubbs) and two of those from Scotland (Dinnet Oakwood NNR, 1975, Chandler; Bognacruie in Abernethy Forest, vi-ix.1999, M. Edwards, RSPB Malaise). Widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Sceptonia humerella* Edwards, 1941**

Distribution. A scattered distribution in S England (10 hectads, 5 of them post-2000), with Waresley Wood the most northerly site. Although it was not first recognised until 1941, it was only known from two old records (Chudleigh, Devon, 1888; Crowborough, Sussex, 1915, 1916) before 1996. Several more recent records include California Country Park (1996) and Dinton Pastures Country Park (2001), Berks; Kingston Down, Oxon (1999); Haugh Wood, Hereford (1998); Metlands Wood, Dorset (2007); Barford Park, Somerset (2019); Waresley Wood, Cambs (2019); Halberton, Devon (2020). Widespread in Europe.

Habitat. Woodland and old hedges (at the two Country Park sites). Adults occur on tree foliage.

Biology. Unknown.

***Sceptonia longisetosa* Ševčík, 2004**

Distribution. A Scottish record of one male in v-vii.2010, by the Allt Ruadh (Red Burn) on the Dundreggan Estate (World Museum Liverpool Malaise trap, Chandler 2013). Widespread but scarce in C and N Europe.

Habitat. The site is a stream valley, inside a steep-sided gorge amongst alder, birch and pine, with an understorey of *Vaccinium* and low herbs.

Biology. Unknown.

***Sceptonia membranacea* Edwards, 1925**

Distribution. Common throughout Britain; widespread in Ireland, also in Scilly Isles (Tresco, 6.x.1970, A.M. Hutson) and Jersey. Widespread in Europe, also in N Africa.

Habitat. Woodland. Adults occur on tree foliage.

Biology. Unknown.

***Sceptonia nigra* (Meigen, 1804)**

Distribution. Common throughout Britain; widespread in Ireland, also in Jersey. Palaearctic, widespread in Europe.

Habitat. Woodland. Adults occur on tree foliage.

Biology. Unknown. Edwards (1925) cited an old record from unnamed fungi. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Sceptonia pilosa* Bukowski, 1934**

Distribution. Only known in Britain from a few localities in S England: Weston Wood, Somerset (16.x.1986, K. Merrifield); Selborne Common, Hants (26.v.1988); The Mens and the Cut, Sussex (10.x.2011); Windsor Forest, Berks (19.vii.2018); Ebernoe Common, Sussex (28.v.2021, R. Mitchell). Widespread in Europe.

Habitat. Ancient broad-leaved woodland.

Biology. Unknown.

***Sceptonia pughi* Chandler, 1991**

Distribution. A few widely scattered records in S England (Chudleigh Rocks, Devon, 11.x.1980; Woodchester Park, Gloucs, 7.x.2010; Tidcombe Lane Fen, Devon, 6.x.2017; Crickley Hill, Gloucs, vii-ix.2019; Buckingham Thick Copse, Northants, 1.vi.1993; Waresley Wood, Cambs, 13.vii and 31.viii.2019), Wales (Dolgellau, Merioneth, 13.v.1867; Minwear Wood, Pembrokeshire, 19.vi. 2010) and Scotland (Craigmore Wood, Perthshire, 22.vi.1999; Dog Falls, Glen Affric, 25.vi. 1999). Widespread in Europe.

Habitat. Broad-leaved and mixed woodland.

Biology. Unknown.

***Sceptonia regni* Chandler, 1991**

Distribution. Only known in Britain from five localities (in 4 hectads), one in S England, Crowborough, Sussex (14-25.vii.1912, F. Jenkinson) and four in N Scotland: Nethy Bridge (15.vi.1923, J.J.F.X. King); Loch Garten (24.v.1991, I. Perry); Upper Quoich (21.vi.2000, A. Godfrey); Granish (30.viii-2.ix.2011, M. Townsend). Palaeartic, in Europe recorded from the Czech Republic and Norway.

Habitat. Scottish sites are Caledonian pine forest, probably mixed woodland at the Sussex site.

Biology. Unknown.

***Sceptonia tenuis* Edwards, 1925**

Distribution. Widely distributed (27 hectads) in S England and Wales, with the most northerly records in Denbighshire (Chirk Castle Park, 1996) and Lincs (Snipe Dales, 2015; Gibraltar Point, 2019). Scarce but with an apparent recent increase in records. Widespread in Europe.

Habitat. Ancient broad-leaved woodland and carr.

Biology. Unknown.

Genus *Trichonta* Winnertz

Slender to robust gnats with slender antennae and legs. Body all dark or variously marked with yellow, legs mainly yellow; wing unmarked in British species, except some diffuse clouding of membrane (a dark shade towards costa near wing tip in *T. vitta*). Clypeus broader than high. Mesonotum with bristles including dorsocentral rows (situated between stripes where this marking is present). Anepisternum bristly. Anepimeron with bristles absent. Two pairs of scutellars, 2 proepisternals. Vein Sc usually rather long and may extend halfway to base of Rs, often ending in R but in some species short and ending free. Base of posterior fork usually below or before that of the median fork, if beyond (*T. vulcani*, *T. tristis* and sometimes *T. icenica*) posterior fork more than half as long as median fork. Fork veins may be setulose or bare. Hind coxa often with a posterobasal bristle present. Hind tibia with series of anterior and dorsal bristles, posterior bristles also sometimes present. Tibial bristles small, mostly little longer than the diameter of the tibia, anterior bristles on hind tibia may be stronger. Wing length 2.5–5.0 mm.

Male genitalia often with one or more corrugations bearing ranks of close-set thick black spinules on middle portion of gonostylus. Female cercus two-segmented.

There are 50 species in Europe, of which 24 are known from Britain. Of these 18 are included among the 40 species keyed by Zaitzev (2003). Gagné (1981) keyed the Holarctic species, including most of those found in Britain. Chandler (1992b) reviewed the British species, adding *T. brigantia*, and resurrected *T. nigracula* as a valid species, regarded as a synonym of *T. vitta* by Gagné. It is here recognised that *T. subterminalis* also occurs in Britain, having been confused with *T. terminalis*; it appears likely that most British records of *T. terminalis* will be found to refer to *T. subterminalis*. Coloration is variable and is summarised for most species within square brackets in key couplets.



Figure 323. (a) *Trichonta subterminalis* ♂.
(b) *Trichonta submaculata* ♂

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Key to *Trichonta* Winnertz

1. Hind coxa with a strong posterobasal bristle. Vein Sc ending in R 2
- Hind coxa without strong bristles 15

2. Hind tibia with some short anteroventral and/or posteroventral bristles, especially near tip. [Legs all yellow] 3
- Hind tibia without anteroventral or posteroventral bristles 5

3. Stem of posterior fork setulose. Scutellum with only 2 pairs of strong bristles. Male genitalia with gonocoxites mainly brown, gonostylus paler; dorsal lobe of gonostylus (arrowed) broad with strong bristles apically. [Mainly dark, grey dusted with mesonotum only yellowish on humeral area; tergites 2-4 may be yellowish apically] *falcata* Lundström, 1911 (p. 359)
- Stem of posterior fork usually bare (occasionally some setulae in *T. hamata*). Scutellum with 3-4 pairs of strong bristles. Male genitalia with gonocoxites partly yellow, gonostylus brown, with dorsal lobe elongate. [Mesonotum usually yellow with three dark stripes] 4

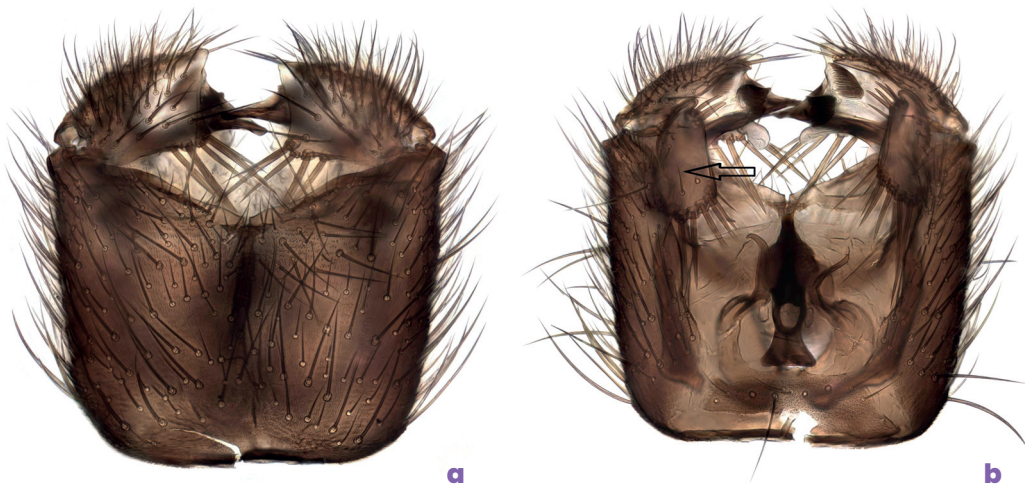


Figure 324. *Trichonta falcata*: (a) ventral and (b) dorsal (tergite 9 and cerci removed) view of ♂ genitalia.

4. Hind tibia with posterior bristles unequal; those on basal two thirds longer than tibial width, on distal third shorter than tibial width; also with posteroventral but no anteroventral bristles. Male genitalia especially large, almost as long as tergites 4-5 together; gonocoxites yellow basally and with a deep ventral apical excavation. Gonostylus with dorsal lobe sharply narrowed beyond broad basal part (arrowed in figure of gonostylus). [Tergites 2-5 yellow laterally and on apical margins] *venosa* (Staeger, 1840) (p. 362)
- Hind tibia with posterior bristles more uniform; both anteroventral and posteroventral bristles present. Male genitalia smaller, less than length of tergites 5-6; gonocoxites with base more or less brown and only shallowly concave apically. Gonostylus with dorsal lobe straight edged and only narrowed near tip (arrowed). [Tergites 2-3 mainly yellow, 4-5 yellow on hind margin] *hamata* Mik, 1880 (p. 360)

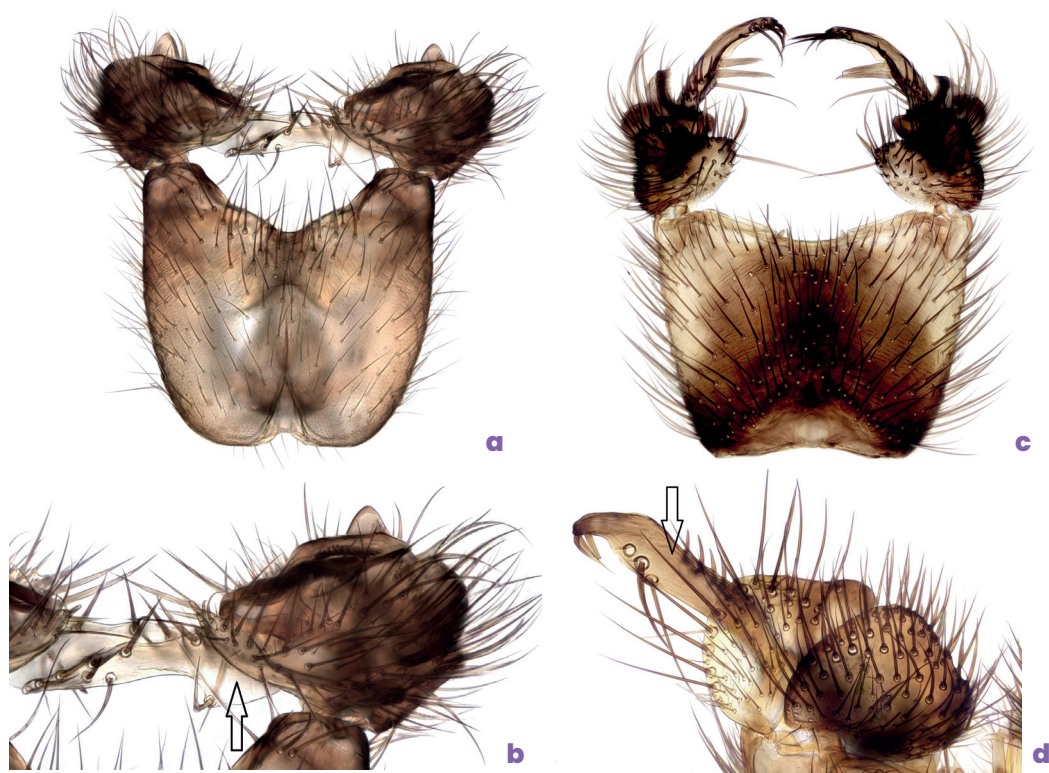


Figure 325. *Trichonta venosa*: (a) ventral view of ♂ genitalia and (b) gonostylus.
Trichonta hamata: (c) ventral view of ♂ genitalia and (d) gonostylus.

5. Stem of posterior fork setulose. Male with gonocoxites truncately produced ventrally with a deep and narrow median incision. [Body mostly dark including genitalia, and wings smoky; tergites 2-4 may have small yellow lateral patches] 6
- Stem of posterior fork bare. Male with gonocoxites with a concave apical margin ventrally or with a broader shallow median excavation 7

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6. Tergite 9 broad medially, distinctly more than half as long as laterally. Aedeagus blunt apically (right arrow), parameres narrow before medially directed apical lobe (left arrow) (both arrows in figure of aedeagus and parameres) *subterminalis* Zaitzev & Menzel, 1996 (p. 361)
- Tergite 9 narrow medially, little more than half as long as laterally. Aedeagus rounded apically (right arrow), parameres shorter and broader before medially directed apical lobe (left arrow) (both arrows in figure of aedeagus and parameres) *terminalis* (Walker, 1856) (p. 361)

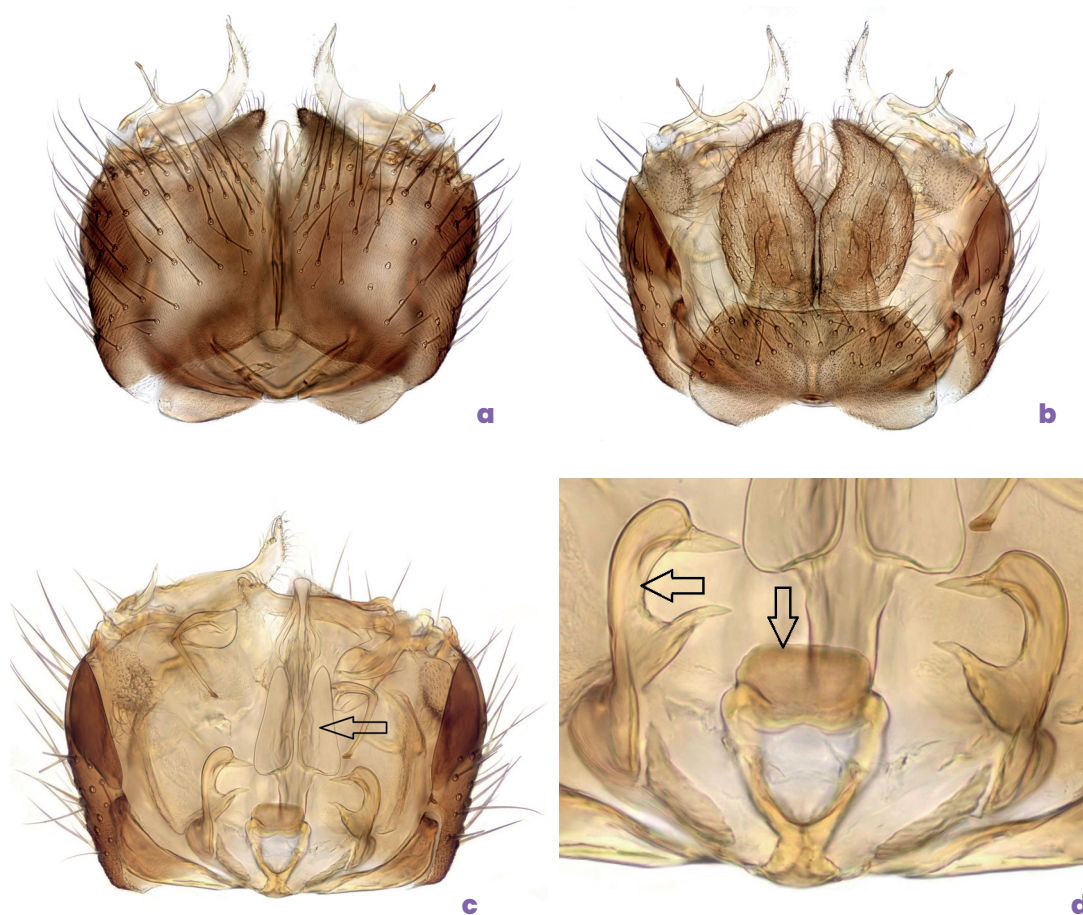


Figure 326. *Trichonta subterminalis*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) dorsal view of ♂ genitalia (tergite 9 and cerci removed, arrow indicates differences in internal structure of the gonocoxites); (d) aedeagus and parameres.

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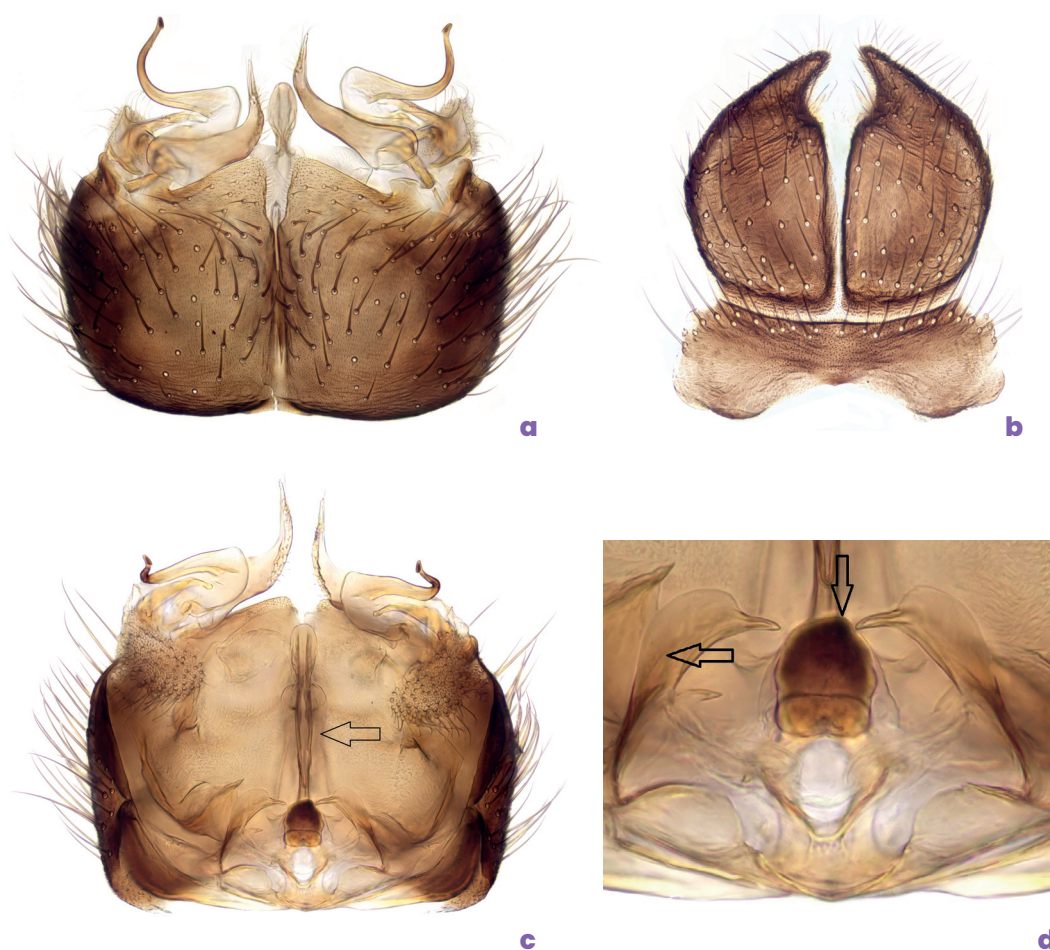


Figure 327. *Trichonta terminalis*: (a) ventral view of ♂ genitalia; (b) dorsal view of tergite 9 and cerci; (c) dorsal view of ♂ genitalia (tergite 9 and cerci removed, arrow indicates differences in internal structure of the gonocoxites); (d) aedeagus and parameres.

- 7. Scutellum with 2 pairs of strong bristles 8
- Scutellum with 3-4 pairs of strong bristles 10

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8. Posterior fork level with or before base of median fork. Hind tibia with uniform bristles. Male gonocoxites mainly brown (yellow apically), with broadly triangular ventral excavation apically. Gonostylus yellow; dorsal lobe with strong bristles in median and apical rows (arrowed). Female fore tarsi simple. [Mesonotum yellow with brown stripes; tergites 2-5 with yellow basal triangles and narrow yellow hind margins] *fragilis* Gagné, 1981 (p. 359)
- Posterior fork begins beyond base of median fork (arrowed in figure of *T. vulcani* wing). [Hind tibia with posterior bristles distinctly shorter on apical third] 9

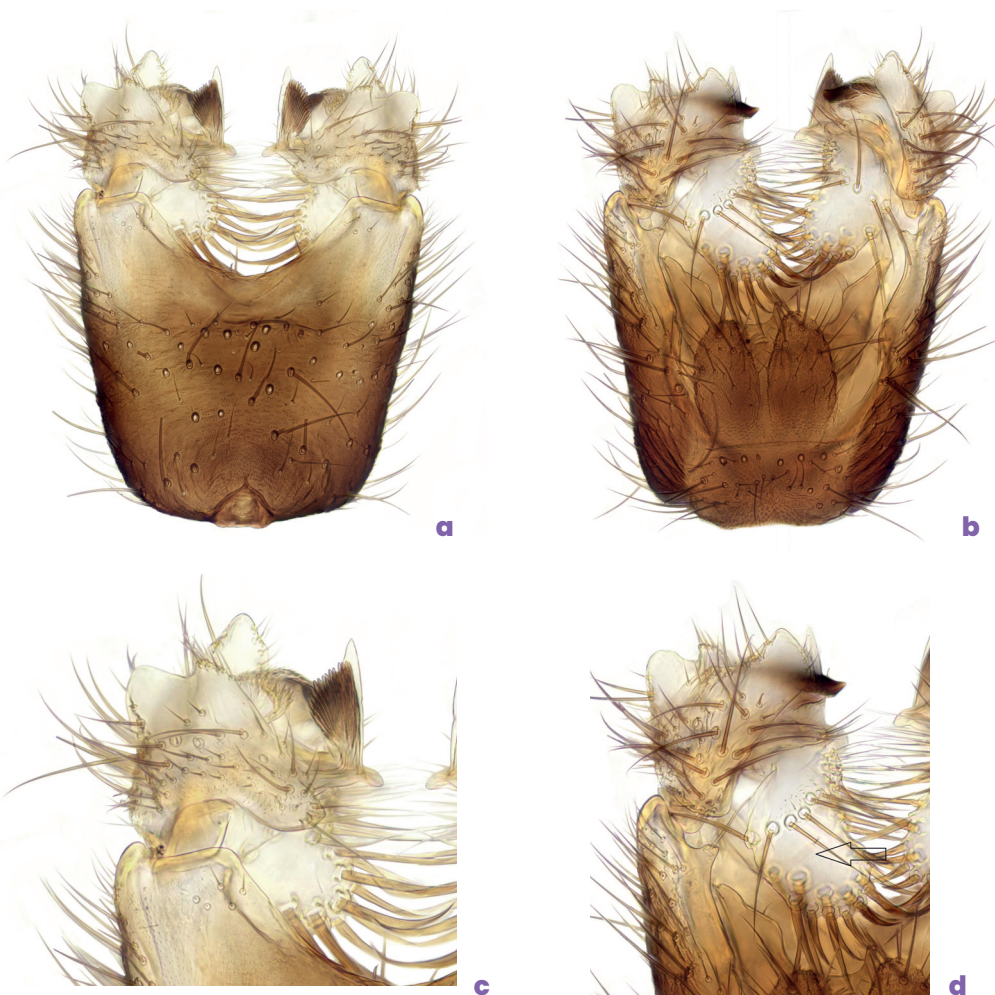


Figure 328. *Trichonta fragilis*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) ventral and (d) dorsal view of gonostylus.

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9. Male genitalia brown; a pair of broad rounded lobes on apical ventral margin of gonocoxites (arrowed). Female fore tarsi swollen. [Body may be all dark, or mesonotum with small yellow humeral spot; abdomen all dark or with vague paler patches on tergites 2-3] *vulcani* (Dziedzicki, 1889) (p. 363)
- Male genitalia with gonocoxites yellow; pair of lobes on apical ventral margin deeper and pointed apically (arrowed). [Mesonotum with pale humeral area; tergites 2 and 3 with yellow lateral spots] [Female not seen] *tristis* (Strobl, 1898) (p. 362)

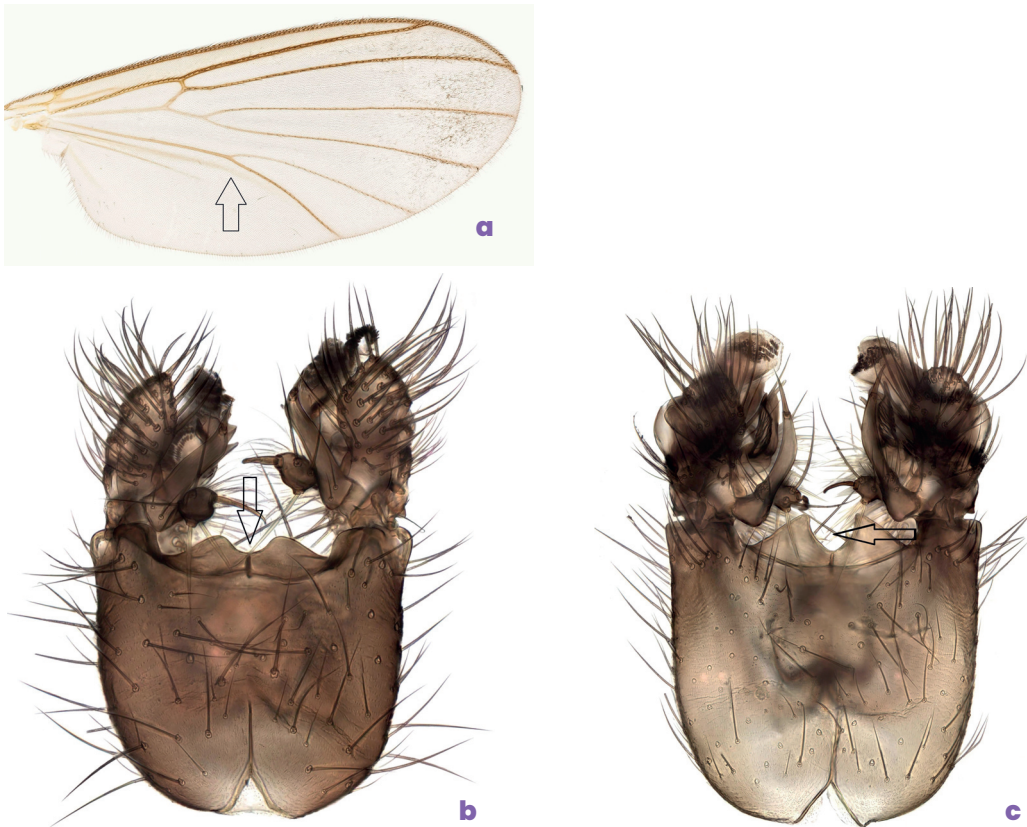


Figure 329. *Trichonta vulcani*: (a) wing; (b) ventral view of ♂ genitalia.
(c) *Trichonta tristis*, ventral view of ♂ genitalia.

10. Male genitalia brown 11
- Male genitalia partly or entirely yellow. Metepisternal bristles long, usually at least as long as sclerite (except sometimes in *T. foeda*) 12

11. Gonocoxites with almost straight apical ventral margin, with broad shallow medial lobe (arrowed). Metepisternal bristles short, much less than half height of sclerite. Female with simple tarsi. [Body mainly brown but mesonotum yellow with dark stripes. Legs yellow but hind coxa may be partly brown] *clavigera* Lundström, 1913 (p. 358)
- Gonocoxites with semicircular lobe (arrowed) set medially in a shallow apical ventral excavation. Metepisternal bristles long, usually at least as long as sclerite. [Body mainly brown but tergites 2-4 (-5) with yellow apical margins. Legs including hind coxa yellow] *girschneri* Landrock, 1912 (p. 359)

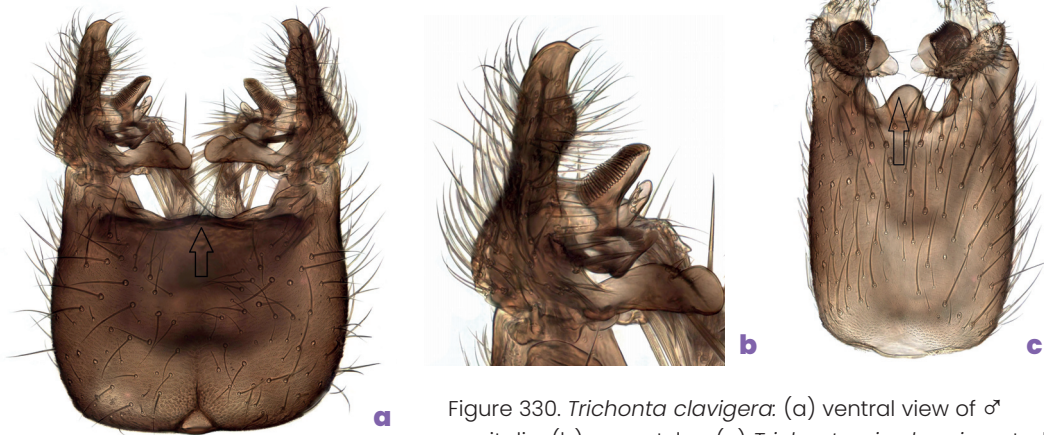


Figure 330. *Trichonta clavigera*: (a) ventral view of ♂ genitalia, (b) gonostylus. (c) *Trichonta girschneri*, ventral view of ♂ genitalia.

12. Male genitalia entirely yellow or brownish yellow. Gonocoxites broader than long with broad apical ventral excavation. Abdominal tergites with yellow markings when present restricted to basal margins *foeda* Loew, 1869 (p. 359)
- Male genitalia partly contrasted yellow and brown. Tergites with yellow markings only on lateral and apical margins13

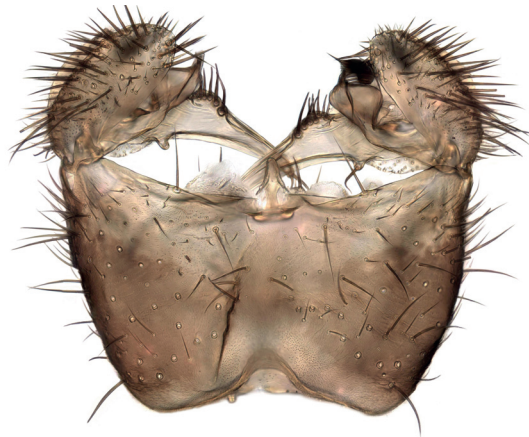


Figure 331. *Trichonta foeda*, ventral view of ♂ genitalia.

13. Male genitalia with gonocoxites brown only on a triangular area at base of ventral surface. Gonostylus with dorsal lobe broadly rounded apically. [Body yellow with two brown stripes on mesonotum and tergites 2-4 with yellow apical bands] *flavicauda* Lundström, 1914 (p. 359)
- Male genitalia brown on apical part of gonocoxites and all of gonostylus. Gonostylus with dorsal lobe narrower and more angular. [Body may be mainly dark with restricted yellow markings but material examined has mesonotum mainly yellow with three brown stripes] 14

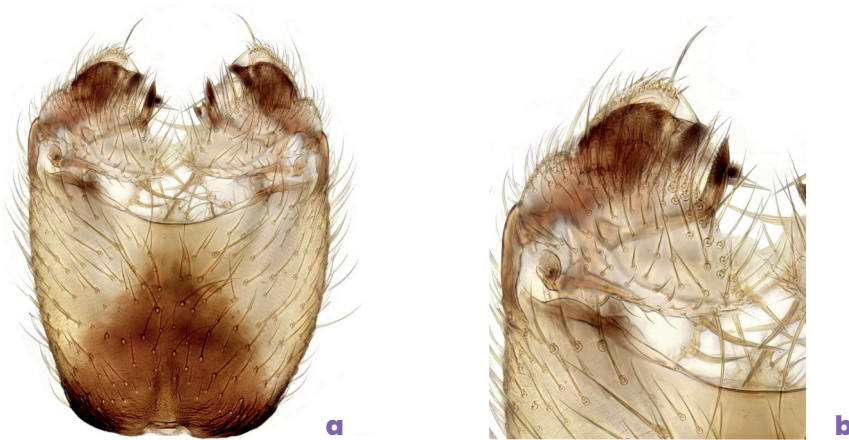


Figure 332. *Trichonta flavicauda*: (a) ventral view of ♂ genitalia; (b) gonostylus.

14. Gonocoxites with shallowly concave apical ventral margin and strong bristles on the mediodorsal margin [only male known]. [Tergite 2 yellow laterally, 3-5 with yellow basal triangles] *fusca* Landrock, 1918 (p. 359)

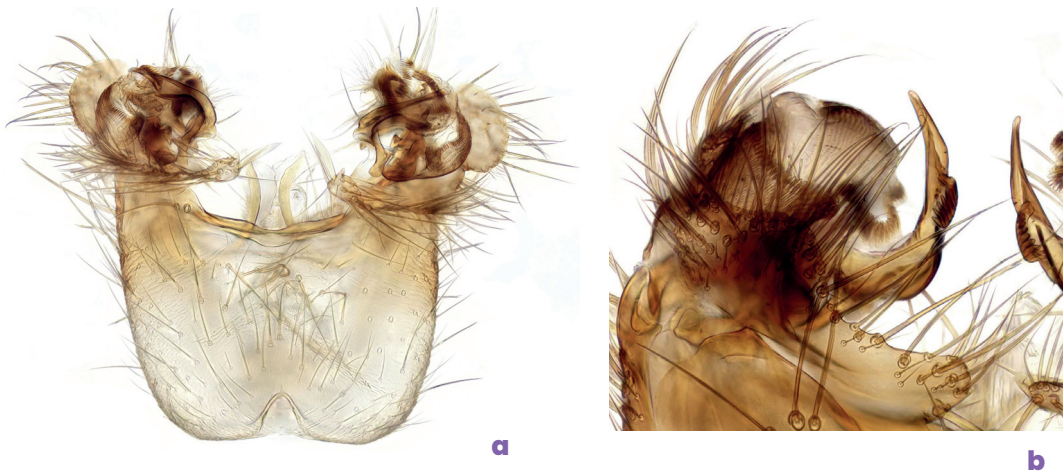


Figure 333. *Trichonta fusca*: (a) ventral view of ♂ genitalia; (b) gonostylus.

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- Gonocoxites with rounded medial excavation of apical ventral margin (arrowed) and without strong bristles mediodorsally. [Tergites 1-4 mainly yellow laterally, dark dorsal area expanded apically on 3-4, may be a yellow basal triangle on tergite 5] ...
..... *bicolor* Landrock, 1912 (p. 358)



Figure 334. *Trichonta bicolor*. (a) ventral view of ♂ genitalia; (b) gonostylus and excavation (arrowed) of gonocoxites.

15. Stem of posterior fork setulose. Base of posterior fork level with or distal to base of median fork 16
- Stem of posterior fork bare. Base of posterior fork usually basal to that of median fork. Metepisternum bristled. Body usually more or less extensively yellow (except *T. nigritula*)
..... 17
16. Metepisternum without bristles. Male genitalia with gonocoxites brown and gonostylus yellow. Gonocoxites with shallowly concave apical ventral margin. Vein Sc ends in R. [Body mainly brown, with mesonotum strongly grey dusted]
..... *apicalis* Strobl, 1898 (p. 358)
- Metepisternum bristly. Male genitalia with both gonocoxites and gonostylus brown. Gonocoxites with a medial excavation (arrowed) to the apical margin. Vein Sc ending free. [Mesonotum shining with only thin grey dusting, brown with yellow humeral area; tergites 2-4 with yellow basal triangles]
..... *pulchra* Gagné, 1981 (p. 361)

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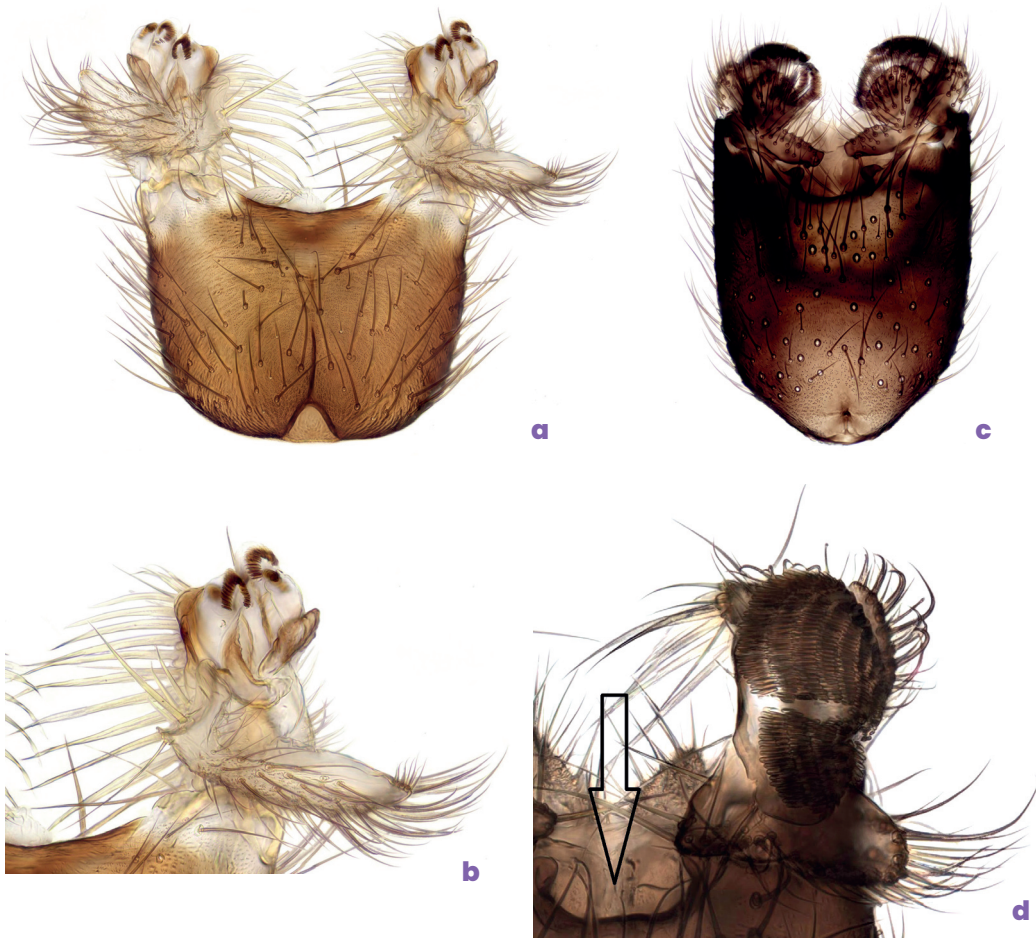


Figure 335. *Trichonta apicalis*: (a) ventral view of ♂ genitalia; (b) gonostylus. *Trichonta pulchra*: (c) ventral view of ♂ genitalia; (d) gonostylus and excavation of gonocoxites.

- 17 Hind femur brown on distal third or fourth. Gonostylus with ventral lobe tapered apically and appearing triangular in ventral view; medial lobe with several dense rows of spinules; dorsal lobe narrow and elongate with strong marginal bristles. Mesonotum grey dusted with more or less broadly yellow humeral areas 18
- Hind femur completely yellow. Gonostylus otherwise formed 21

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18. Hind tibia with a row of 5-8 short posterior bristles on apical half. Vein Sc ending in R. Male genitalia yellow. Gonostylus resembling *T. vitta*, but dorsal lobe (arrowed) with strong bristles restricted to posterior margin and tip, except for a few near base (also elsewhere on ventral surface in *T. vitta*). [Mesonotum strongly dusted, yellow with three brown stripes; tergites 2-3 yellow laterally] *submaculata* (Staeger, 1840) (p. 361)
- Hind tibia without posterior bristles 19

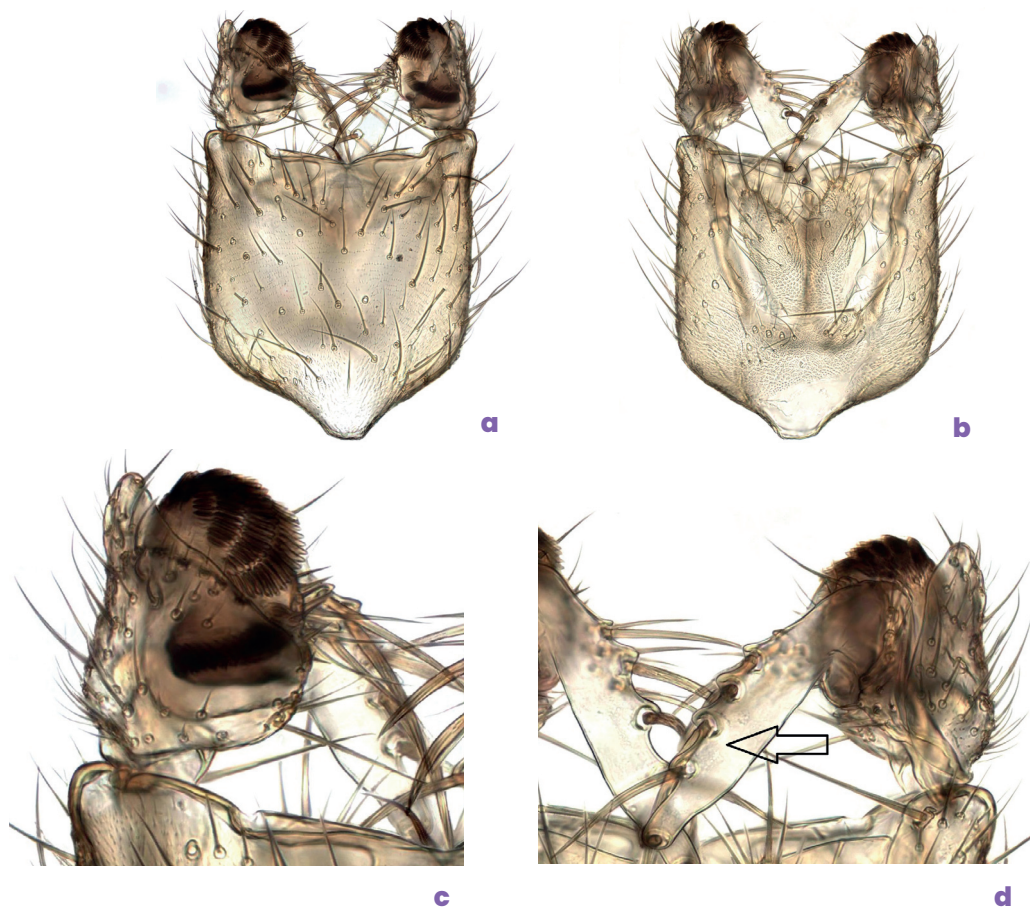


Figure 336. *Trichonta submaculata*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) ventral and (d) dorsal view of gonostylus.

19. Vein Sc ending in R. Wing hyaline. Male genitalia yellowish brown. Gonocoxites with a group of long bristles near ventral apical margin medially (arrowed). Gonostylus with dorsal lobe bearing strong bristles only on its margins. [Mesonotum mainly brown with yellow humeral areas; tergites 2–3 with yellow patches laterally] *icenica* Edwards, 1925 (p. 360)
- Vein Sc ending free. Gonocoxites without such a cluster of bristles. Gonostylus with dorsal lobe bearing some strong bristles on its ventral surface (arrowed in *T. vitta*) as well as on the posterior margin 20



Figure 337. *Trichonta icenica*. (a) ventral and (b) dorsal view of ♂ genitalia; (c) ventral and (d) dorsal view of gonostylus; (e) gonocoxal bristles.

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20. Gonocoxites with a row of strong bristles near apical ventral margin (arrowed). Male genitalia dark. Wing clear. [Body mainly black, grey dusted] *nigritula* Edwards, 1925 (p. 360)

- Gonocoxites without strong bristles on apical ventral margin. Male genitalia yellow to light brown. Gonostylus similar to *T. submaculata*, but with strong bristles on dorsal lobe (arrowed) more extensive on ventral surface. Wing usually with a dark shade towards costa near wing tip (in both sexes). [Body more or less extensively yellow, at least humeral area, sometimes with brown thoracic stripes on a yellow ground; tergites 2-4 yellow basally and laterally] *vitta* (Meigen, 1830) (p. 362)

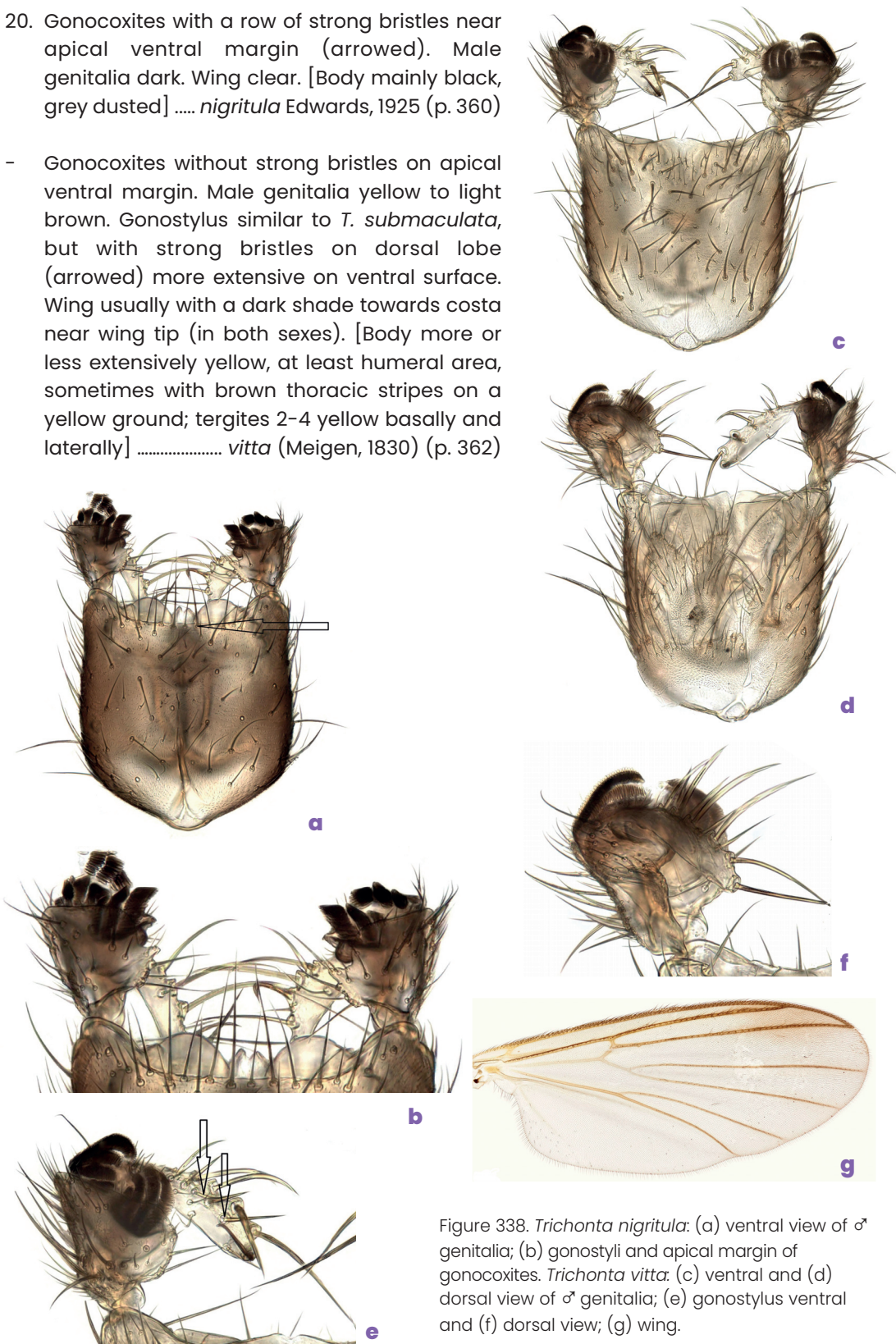


Figure 338. *Trichonta nigritula*: (a) ventral view of ♂ genitalia; (b) gonostyli and apical margin of gonocoxites. *Trichonta vitta*: (c) ventral and (d) dorsal view of ♂ genitalia; (e) gonostylus ventral and (f) dorsal view; (g) wing.

21. Male genitalia with dorsal lobe of gonostylus short with dense bristles (upper arrow in dorsal view). Cerci broad (lower arrow in dorsal view). Hind tibia with about ten posterior bristles (not close-set) on apical two thirds; also some anteroventral and posteroventral bristles present [sometimes a short posterobasal bristle on hind coxa] [female not recognised]. [Body mainly dark; mesonotum grey dusted with three brighter brown stripes apparent; abdomen entirely brown] *brigantia* Chandler, 1992 (p. 358)
- Male genitalia with dorsal lobe of gonostylus elongate. [Body with more or less extensive yellow markings] 22

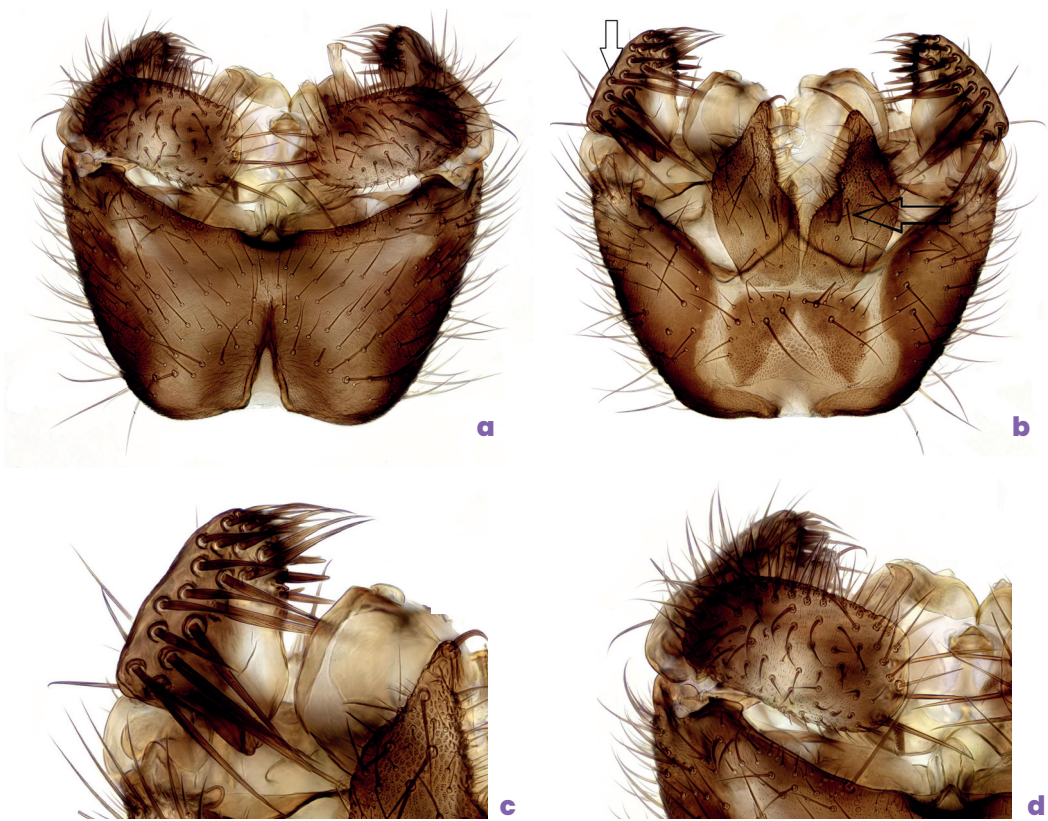


Figure 339. *Trichonta brigantia*: (a) ventral and (b) dorsal view of ♂ genitalia; (c) dorsal and (d) ventral view of gonostylus.

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22. Hind tibia with 3–8 short posterior bristles. Male genitalia largely yellow with cerci broad. Ventral lobe of gonostylus with blunt apical margin bearing a group of short bristles (arrowed); dorsal lobe of gonostylus elongate but not much attenuated. Female tergites 7–8 without spinose bristles. [Coloration as in *T. vitta*, may be mainly dark except genitalia] *subfusca* Lundström, 1909 (p. 361)
- Hind tibia with close-set (12 or more) posterior bristles on apical two thirds. Male genitalia mainly brown with cerci and dorsal lobe of gonostylus long and slender, widely overlapping. Female tergites 7–8 with spinose bristles. [Mesonotum usually mainly yellow with three dark stripes, sometimes fused leaving only humeral area yellow; abdomen with yellow apical bands on tergites or yellow along junctions between tergites 2–5] 23

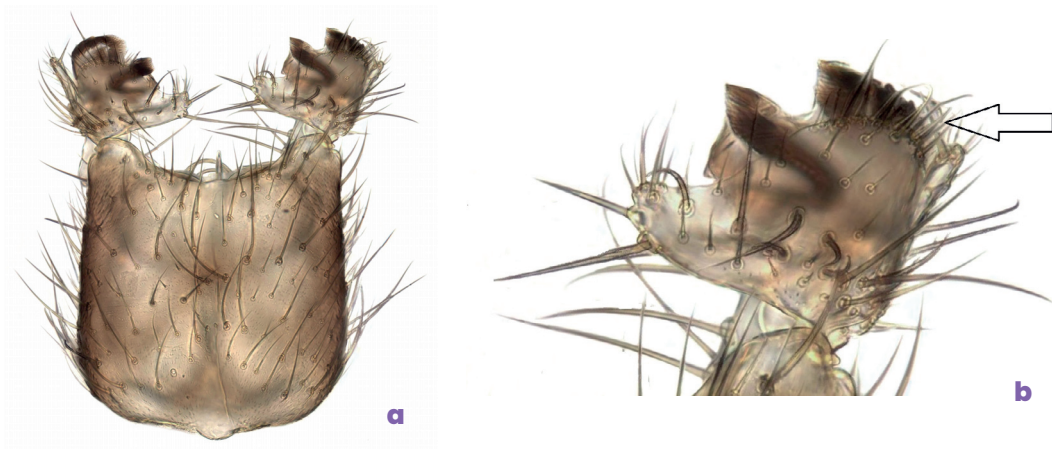


Figure 340. *Trichonta subfusca*: (a) ventral view of ♂ genitalia; (b) gonostylus.

23. Male genitalia: gonocoxites with distinct deep median apical ventral excavation (arrowed in ventral view). Gonostylus with spines on medial lobe; bristles on dorsal lobe very long, more than half its length (arrowed in dorsal view). [Female not separated from *T. atricauda*] *melanura* (Staeger, 1840) (p. 360)
- Male genitalia: gonocoxites with apical ventral margin only shallowly concave (lower arrow). Gonostylus without spines on medial lobe; bristles on its dorsal lobe relatively shorter, not more than half its length (two upper arrows) *atricauda* (Zetterstedt, 1852) (p. 358)

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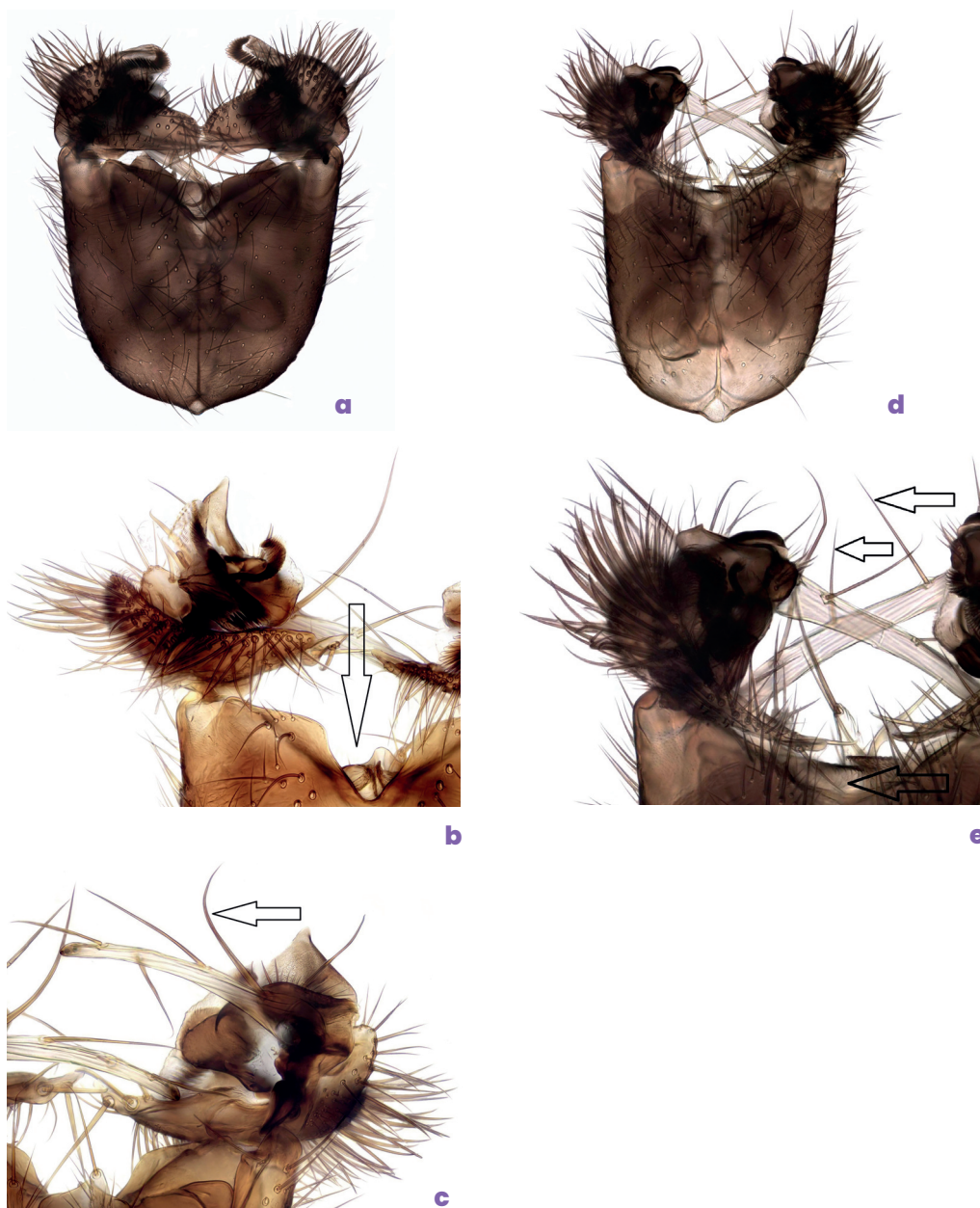


Figure 341. *Trichonta melanura*: (a) ventral view of ♂ genitalia; (b) ventral and (c) dorsal views of gonostylus and margin of gonocoxites. *Trichonta atricauda*: (d) ventral view of ♂ genitalia; (e) gonostylus.

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Species notes

Trichonta apicalis Strobl, 1898

Distribution. Scattered records in eastern England (14 hectads) and four in Scotland (Mar Lodge Estate, Migdale Wood, Birks of Aberfeldy, Carrbridge). Widespread in Europe.

Habitat. Woodland.

Biology. **British records:** develops in the terrestrial club fungus *Calocera cornea*, with bright yellow larvae feeding internally in the fungus and pupating in cocoons outside the fungus (Buxton 1960, Trifourkis 1977).

Trichonta atricauda (Zetterstedt, 1852)

Distribution. Common throughout Britain, recorded less than the allied species *T. melanura*; several eastern records in Ireland. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown; the record by Edwards (1925) cited by Jakovlev (1994) related to *T. melanura*.

Trichonta bicolor Landrock, 1912

Distribution. Only known in Britain from one old Scottish record (Dingwall vii-viii.1909, J.J.F.X. King) and five recent records from S England: King's Forest, Suffolk (30.iv.1994, I. Perry); Epping Forest, Essex (18.viii.1998, Chandler); Burnham Beeches, Bucks (23.vi.2018, Chandler); Warburg Reserve, Oxon (I. Perry); Flitwick Moor, Beds (19.v and 30.vi.2018, I. Perry). Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

Trichonta brigantia Chandler, 1992

Distribution. Discovered in N Yorkshire in the 1980s (Highscree Wood, 1980; Birk Gill and Gunnerside, 1985) and an earlier record from Cheshire (Goyt Valley, 1940) later came to light (Chandler 1992). It has since been found at one site in Scotland (Glen Gynach, Kingussie, 24.x.1999, Chandler). All records were in October. Otherwise only recorded from Norway (Jostein Kjærandsen *pers. comm.*, an addition to Kjærandsen and Sæli 2020).

Habitat. Broad-leaved woodland by streams.

Biology. Unknown.

Trichonta clavigera Lundström, 1913

Distribution. Widespread in Britain though rather local in occurrence (37 hectads, 17 post-2000); a few scattered Irish records (3 hectads). Widespread in Europe, also in N Africa.

Habitat. Most records from ancient broad-leaved woodland.

Biology. Unknown.

***Trichonta falcata* Lundström, 1911**

Distribution. Widely distributed and frequent in Britain; in Ireland only recorded at Glendalough, Co Wicklow (1985, 1986). Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. **British records:** reared from the wood-encrusting fungus *Stereum hirsutum* (Edwards 1925, larval habits as in *T. foeda*, commenting that he had always found larvae of either or both this and *T. foeda* on large patches of this fungus; Madwar 1937).

***Trichonta flavicauda* Lundström, 1914**

Distribution. Only known in Britain from old records from Nethy Bridge (1908, 1923, 1967) and one more recent record from the Mar Lodge Estate, Braemar (Dubh Ghleann, 15.vi.2003, Chandler). Holarctic, widespread in C and N Europe.

Habitat. The more recent record was from a heavily deer-grazed remnant of Caledonian pine forest.

Biology. **No British records. Other records:** *Trichaptum abietinum* on a spruce log (Jakovlev 2011, Finland), *T. laricinum* (Zaitzev 2003, Russia as *Hirschioporus abietis*).

***Trichonta foeda* Loew, 1869**

Distribution. Locally common throughout Britain; widespread in Ireland (4 hectads), also in Jersey. Holarctic, widespread in Europe, also in N Africa.

Habitat. Woodland.

Biology. **British records:** reared from the wood-encrusting fungus *Stereum hirsutum* (Edwards 1925, larvae under patches of mucilage and excrement on undersurface of fungus, see comments under *T. falcata*; several rearings by R. Fortey, Fortey and Chandler 2021).

***Trichonta fragilis* Gagné, 1981**

Distribution. Widely distributed throughout Britain, with a recent increase (45 of 63 hectads are post-2000); Irish records (3 hectads) are from near the east coast. Holarctic, widespread in Europe.

Habitat. Damp broad-leaved woodland.

Biology. Unknown.

***Trichonta fusca* Landrock, 1918**

Distribution. Long known in Britain only from Monk's Wood NNR, Hunts 1972 (Cole and Chandler 1979), now three recent records: Yocklett's Bank, Kent (8.vii.2016, A. Halstead); Waresley Wood, Cambs (29.vi.2019, I. Perry); Crickley Hill, Gloucs (v-x.2019, K. Alexander). Widespread in Europe.

Habitat. Broad-leaved woodland.

Biology. Unknown.

***Trichonta girschneri* Landrock, 1912**

Distribution. Only known from a single record of a male from Hawksmoor Wood, Staffordshire on 23 June 2018 (R. Morris; Chandler 2020). Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. No British records. **Other records:** reared from *Cerioporus* (as *Datronia*) *mollis* on a decaying aspen log (Jakovlev 2011, Finland), a resupinate polypore on spruce (Zaitzev 1984) and an *Oxyporus* species on *Maackia amurensis* (Zaitzev 2003).

***Trichonta hamata* Mik, 1880**

Distribution. Common in Scotland and N England, with a few records from Wales and two older records from S England (Monk's Wood NNR, Hunts, 1972; by River Wey, Conford, Hants, 1989). Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. No British records. **Other records:** reared from mycelium on rotting wood (Zaitzev 1984, Russia), *Peniophora laurentii* on decayed birch log (Jakovlev 2011, Finland).

***Trichonta icenica* Edwards, 1925**

Distribution. Scattered records in S England and Wales (12 hectads). The only post-1990 records are from Aylesbeare Common, Devon (2000, C. Plant) and East Finchley (2017, D. Painter), suggesting a decline. Palaearctic, widespread in Europe, also in N Africa.

Habitat. Woodland, carr and wetlands.

Biology. No British records. **Other records:** reared from the club fungus *Calocera viscosa* (Ševčík 2006, 2010, Czech Republic, commenting on the comparable record of *T. apicalis* from *C. cornea*).

***Trichonta melanura* (Staeger, 1840)**

Distribution. Common throughout Britain; several records from the east of Ireland. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. **British records:** larvae within a bark-encrusting fungus (queried as *Corticium* sp.), no cocoon being observed (Edwards 1925, as *T. atricauda*). The record from *Stereum hirsutum* by Falcoz (1921) requires confirmation.

***Trichonta nigrītula* Edwards, 1925**

Distribution. Described from Shefford, Beds (1917) and not recorded again until found on the 1980s wetland survey in East Anglia (4 sites in 3 hectads) and contemporary surveys in Wales (Oxwich) and Oxfordshire (Wychwood). Otherwise recorded from the Black Wood of Rannoch, Perthshire (1992) and then more recently found at seven widely scattered sites: Kippen Muir, Stirling (2015); Clayhidon Turbary, Devon (2015); Thorneythwaite Fell, Cumbria (2017); Windsor Forest, Berks (2017); Snipe Dales, Lincs (2017, 2018); Chippenham Fen, Cambs (2018, 2020); Ausewell Wood, Devon (2019). Chandler (2018b) recorded it from Ireland (Breen Wood, Co Antrim, viii-x.2017, A. Mantell), also in Jersey. Holarctic, widespread in Europe.

Habitat. Damp woodland, carr and fen.

Biology. Unknown.

***Trichonta pulchra* Gagné, 1981**

Distribution. Scattered sites in England north to Cumbria (17 hectads, 11 post-2000). First found in Britain in 1971 at Monks Wood NNR, where it was numerous in suction trap material; more recent records are mostly from flight interception and water traps. Holarctic, widespread in Europe.

Habitat. Damp broad-leaved woodland.

Biology. Unknown.

***Trichonta subfusca* Lundström, 1909**

Distribution. Common in the Scottish Highlands and frequent in SE England, with scattered records between these areas. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. **No British records.** **Other records:** reared from mycelium on rotting wood (Zaitzev 1984, Russia), and the wood-encrusting fungus *Exidia repanda* on a decaying log of dwarf birch *Betula nana* (Jakovlev 2011, Finland).

***Trichonta submaculata* (Staeger, 1840)**

Distribution. Frequent throughout Britain. Palaearctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Trichonta subterminalis* Zaitzev & Menzel, 1996**

Note. This species is newly added to the British list. See under *T. terminalis* below regarding the basis for recognition of this species.

Distribution. From material so far examined, this species is common and widely distributed throughout Britain.

Habitat. Woodland.

Biology. **British records:** It is yet to be established to which species the rearing records mentioned under *T. terminalis* refer.

***Trichonta terminalis* (Walker, 1856)**

Note. Gagné (1981) regarded *T. terminalis* as a distinctive species with a Holarctic distribution. Two allied species have since been described as *T. subterminalis* Zaitzev & Menzel, 1996 and *T. paraterminalis* Zaitzev, 1999. The three species were keyed and illustrated by Zaitzev (2003), who distinguished *paraterminalis* in the key as having yellow markings on tergites 2-3(or 4) while the other two had the abdomen entirely dark brown; specimens examined of this group vary in the extent of yellow coloration on the abdomen and this is concluded to be an unreliable character. *T. subterminalis* differed in a medial process (which Zaitzev termed the aedeagus) having a straight apex, while the other two had it rounded apically. This structure is, however, of gonocoxal or hypandrial origin and the aedeagus is an internal structure not figured previously. From photographs of Estonian specimens supplied by Olavi Kurina, and identified by him as *T. terminalis* and *T. subterminalis*, it has been possible to recognise that both species occur in Britain, with

subterminalis the commoner species. *Trichonta terminalis* was described by Walker from one or more English specimens. Edwards synonymised *T. funebris* Winnertz with it, based on Dziedzicki's (1915) figure of Winnertz' type, so a Walker specimen must have existed then. However, Gagné (1981) said that Tony Hutson had told him that Walker's type was missing and this has been confirmed by Erica McAlister (*pers. comm.* 26.v.2021). As Winnertz' collection is also lost, Zaitzev's identification of *terminalis* must be accepted.

Distribution. British specimens confirmed to be *T. terminalis* are from Wales (Blaen-y-Cwm, Brecon, 11.x.2008) and Scotland (Lagganlia, 22.vii.2012). The aggregate species is common throughout Britain with three eastern records from Ireland, but most records are likely to refer to *T. subterminalis* as identified here. Whether one or more members of this group are Holarctic remains to be clarified. Widespread in Europe.

Habitat. Woodland.

Biology. British records: reared from a flat purplish wood-encrusting fungus on a fallen branch (? as *Corticium* sp.) (Edwards 1925), and from the wood-encrusting fungi *Peniophora cinerea* and *P. incarnata* by R.E. Evans (Chandler 1993b).

Trichonta tristis (Strobl, 1891)

Distribution. There are recent records from three Scottish sites (Dundreggan, 25.viii.2016, Chandler; Glen Fruin, 9.ix.2017, A. Stubbs; Rogie Falls, 14.vi.2018, R. Morris) (Chandler 2018a, 2020). Widespread in C (Austria, Switzerland) and N Europe.

Habitat. Woodland; the Glen Fruin site is an alderwood

Biology. Unknown.

Trichonta venosa (Staeger, 1840)

Distribution. Common in the Scottish Highlands, with a scattered mainly western distribution further south, with a few mostly older records from S England, with the most recent southern records from Epping Forest (1998–2001) and Flitwick Moor, Beds (2018). Also in Isle of Man (Aust Reserve, Lezayre, 22.x.2019, S. Crellin). Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. British records: reared from larvae living in puff-balls of an unnamed species (Edwards 1925), but interpreted by subsequent authors (e.g. Landrock 1927) as a *Lycoperdon* sp.

Trichonta vitta (Meigen, 1830)

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man and Jersey. Holarctic, widespread in Europe, also in N Africa.

Habitat. All types of woodland.

Biology. British records: *Schizopora paradoxa* (Edwards 1925, Madwar 1937, Buxton 1960, Chandler 1993b, Fortey and Chandler 2021), repeatedly reared from this fungus by Edwards (1925), who commented that larvae may be detected by brownish discoloration of the surface; *Hypoxylon* sp. (J. Webb). **Other records:** *Vitreoporus* (as *Gloeoporus*) *dichrous* on a decaying elm log, *Schizopora paradoxa* (as *Hyphodontia paradoxa*) (Jakovlev 2011, Finland). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Trichonta vulcani* (Dziedzicki, 1889)**

Distribution. Widespread in the Scottish Highlands (15 hectads) with fewer records further south, mainly in N England (7 hectads), N Wales (2 hectads) and SW England (6 hectads); the few records in S England (5 hectads) are from the New Forest, Savernake Forest, Bucklebury Common, Burnham Beeches, and most recently Winterfold Woods, Surrey (2017). Deady (2012, 2013) recorded it from Ireland (Shanavaur Wood, Co Laois, 2010). Holarctic, widespread in Europe, also in N Africa.

Habitat. Damp broad-leaved woodland.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Genus *Zygomyia* Winnertz

Small dark coloured gnats. Mesonotum all dark or with more or less yellow humeral areas; wing markings sometimes present; legs yellow with dark tip to hind femur. Clypeus ovate. Mesonotum more or less dusted and without any pitting (in contrast to *Sceptonia*), with short bristling except for longer prescutellar pair. Anepisternum bristly; this and katepisternum of comparable size and roughly square. Anepimeron large, with a series of strong bristles near upper margin. Laterotergite large and projecting. Two pairs of scutellars, 3 proepisternals. Veins of median fork setulose. Posterior fork absent, or if present (*Z. semifusca*) less than a third length of median fork. Vein CuA is bare (except apically in *Z. semifusca*), as are bm-m and stem of median fork. Veins M₂ and CuA strongly divergent. Mid and hind tibiae with anterior and dorsal series of strong bristles; mid tibia also with strong ventral bristles. Wing length 2.0–3.5 mm.

Male genitalia with gonostylus usually comprising two articulating lobes, the dorsal and ventral stylomeres, these sometimes fused basally. Cerci separate. Female cercus two-segmented.

There are 13 European species, of which 9 are known from Britain. The key to 10 species by Zaitzev (2003) includes 7 of the British species (omitting *valida* described in his text).



Figure 342. *Zygomyia humeralis* ♂.

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Key to *Zygomyia* Winnertz

1. Wing with posterior fork short and weakly developed (arrowed), with anterior branch weak or interrupted basally. Mid tibia with single long ventral bristle. Wing with central spot connected to preapical shade
..... *semifusca* (Meigen, 1818) (p. 370)
- Wing with CuA unforked (arrowed in figure of *Z. vara* wing) 2



Figure 343. *Zygomyia semifusca* ventral view of ♂ genitalia.

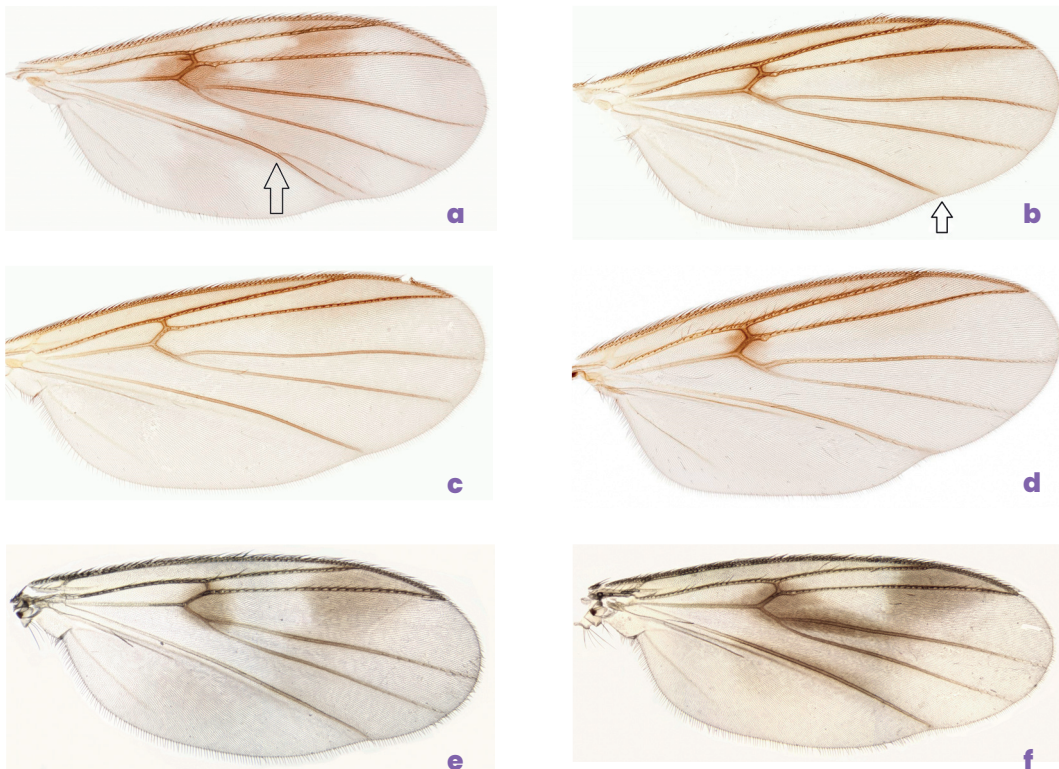


Figure 344. Wing of *Zygomyia*: (a) *semifusca*; (b) *vara*; (c) *valida*; (d) *humeralis*; (e) *pictipennis* ♂; (f) *pictipennis* ♀.

2. Wing with large dark marking filling end of cell r_1 and extending towards M_1 and a median spot over $r-m$ and stem of median fork in both sexes, female also with the median spot connected along the median fork with the preapical spot *pictipennis* (Staeger, 1840) (p. 369)
- Wing with at most a central spot over $r-m$ 3
3. Wing without distinct central spot (more or less obviously shaded in *Z. vara*). Dorsal and ventral lobes of gonostylus fused basally. Mid tibia with ventral bristles short and weak and usually 4 dorsal bristles. Hind tibia without posterodorsal bristles 4
- Wing with dark central spot (as in *Z. humeralis* wing Figure 344). Dorsal and ventral lobes of gonostylus not fused basally. Mid tibia with 1 or more strong ventral bristles and 5 dorsal bristles. Hind tibia with a series of short posterodorsal bristles on apical half 7
4. Crossvein $r-m$ and adjacent veins distinctly darkened and sometimes a dark shade in cell r_1 . Gonostylus with strong spines. Female with front tarsi slender *vara* (Staeger, 1840) (p. 370)
- Wing unmarked. Gonostylus without strong spines. Female front tarsi may be thickened beneath (the condition in *Z. valeriae* and *Z. matilei* requires confirmation) 5

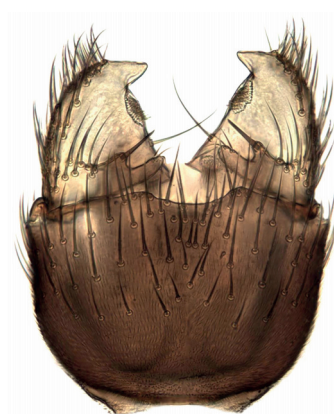
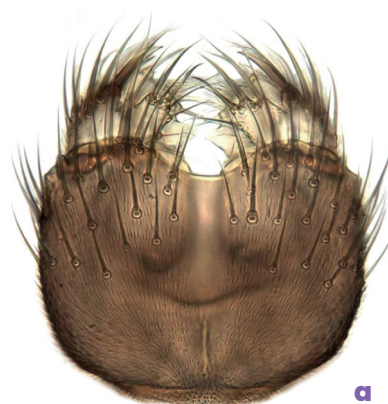


Figure 345. *Zygomyia pictipennis*, ventral view of σ^7 genitalia.



a



c



b

Figure 346. *Zygomyia vara*: (a) ventral and (b) dorsal view of σ^7 genitalia; (c) gonostylus.

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5. Ventral apical margin of gonocoxites without excavation medially. Posterior wing veins grey tinged *matilei* Caspers, 1980 (p. 369)
- Ventral apical margin of gonocoxites with excavation medially (margin of excavation arrowed in both species, *Z. valida* and *Z. valeriae*). Posterior wing veins clear 6



Figure 347. *Zygomyia matilei*, ventral view of ♂ genitalia.

6. Ventral apical margin of gonocoxites with shallow triangular excavation medially, not exceeding half their length *valida* Winnertz, 1864 (p. 370)
- Ventral apical margin of gonocoxites with broader and deeper medial excavation greater than half their length *valeriae* Chandler, 1991 (p. 370)

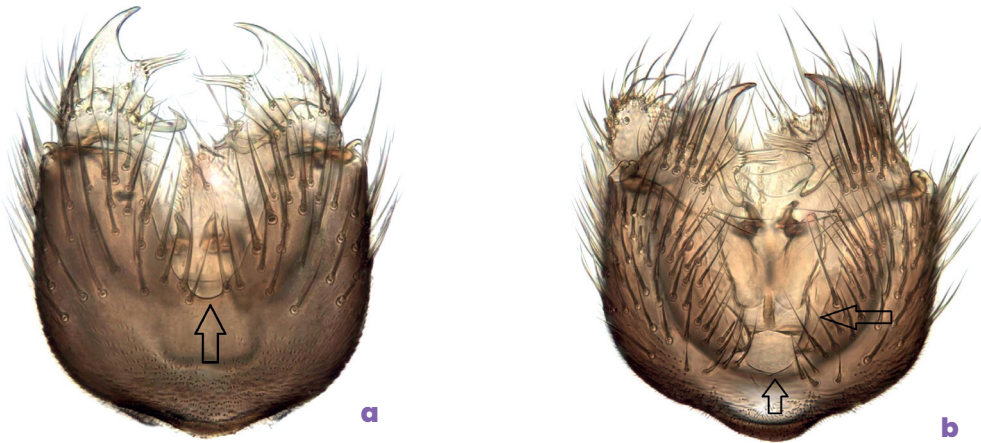


Figure 348. Ventral view of ♂ genitalia: (a) *Zygomyia valida*; (b) *Zygomyia valeriae*.

7. Gonocoxites with medial subapical bristling differentiated from general bristling of their ventral surface, with bristles there either stronger or finer than other bristles. Mid tibia with two ventral and two anterior bristles 8
- Gonocoxites without differentiated apical or subapical bristling, but bristles medially either more or less widely spaced. Mid tibia with three ventral and three anterior bristles 9

8. Ventral lobe of gonostylus about as long as broad, only shallowly concave on apical margin. Gonocoxites with an irregular row of strong subapical bristles medially (arrowed) *humeralis* (Wiedemann, 1817) (p. 369)
- Ventral lobe of gonostylus with concave apical margin and an apically rounded medial lobe. Gonocoxites without strong subapical bristles, but with a dense group of fine setulae (arrowed) medially near apical margin *pseudohumeralis* Caspers, 1980 (p. 370)

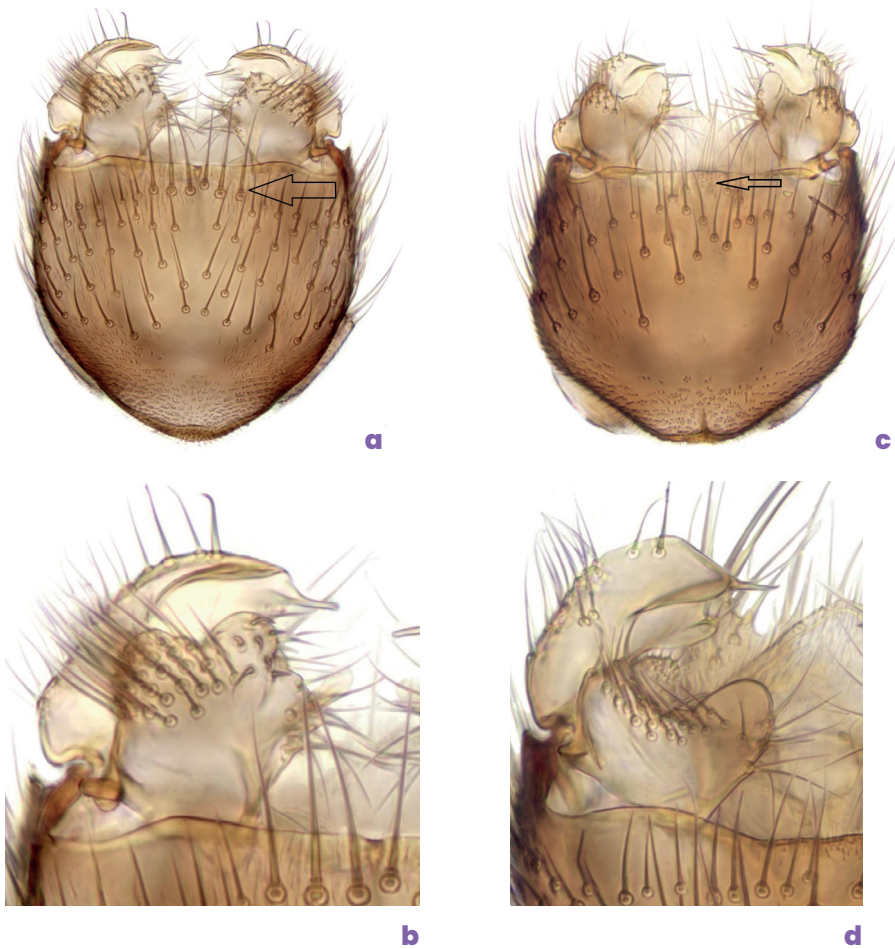


Figure 349. *Zygomyia humeralis*: (a) ventral view of ♂ genitalia; (b) gonostylus.
Zygomyia pseudohumeralis: (c) ventral view of ♂ genitalia; (d) gonostylus.

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9. Gonostylus with ventral lobe broader than long and dorsal lobe not indented laterally. Gonocoxites with longer widely spaced bristles medially *kiddi* Chandler, 1991 (p. 369)
- Gonostylus with ventral lobe not broader than long and dorsal lobe with lateral indentation (arrowed). Gonocoxites with denser bristling medially *notata* (Stannius, 1831) (p. 369)

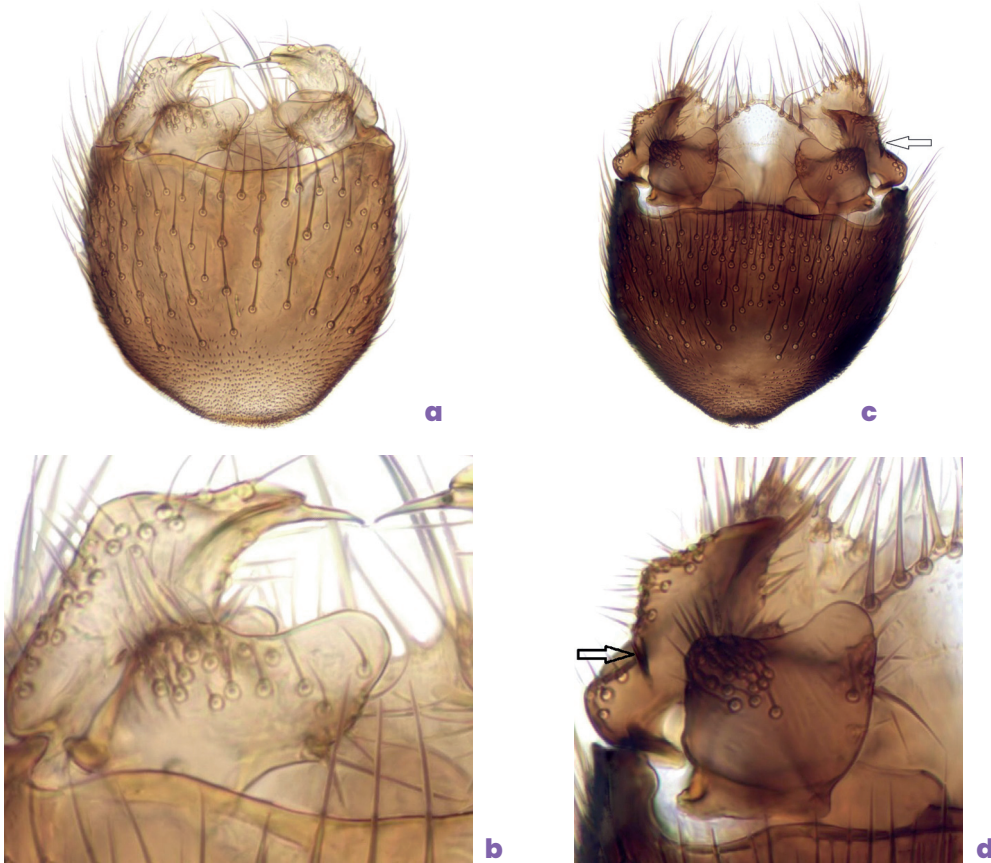


Figure 350. *Zygomyia kiddi*: (a) ventral view of σ genitalia; (b) gonostylus.
Zygomyia notata: (c) ventral view of σ genitalia; (d) gonostylus.

Species notes

Zygomyia humeralis (Wiedemann, 1817)

Distribution. Common throughout Britain; widespread in Ireland. Widespread in Europe, also in N Africa.

Habitat. All types of woodland, woodland edge and open habitats.

Biology. Unknown.

Zygomyia kiddi Chandler, 1991

Distribution. Frequent throughout England, north to Durham, a few Welsh records and one from Scotland (Glen Nant, Argyll, 14.ix.2017). Widespread in C and N Europe.

Habitat. Woodland.

Biology. Unknown. Jakovlev (2011) reported that it had been obtained in an emergence trap over dead wood in Finland.

Zygomyia matilei Caspers, 1980

Distribution. Earlier recorded from Jersey (Waterworks Valley, St Lawrence, 8.x.1994, A. Warne) but more recently mainland records in Britain: the Warburg Reserve, Bix Bottom, Oxon (22.x.2011) (Chandler 2013), Pondhead Inclosure, New Forest, Hants (19.vii.2016), Brandon Country Park, Suffolk (4.vii.2019) (all I. Perry) and from Scadsbury Moor, Devon (vii-xi.2016, R. Wolton). Widespread but scarce in C and N Europe.

Habitat. Woodland.

Biology. Unknown.

Zygomyia notata (Stannius, 1831)

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man. Palearctic, widespread in Europe.

Habitat. All types of woodland, woodland edge and open habitats.

Biology. Unknown. Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

Zygomyia pictipennis (Staeger, 1840)

Distribution. Common throughout Britain; widespread in Ireland, also in Isle of Man. Widespread in Europe.

Habitat. Woodland.

Biology. **No British records.** **Other records:** the wood-encrusting fungus *Cylindrobasidium laeve* on a spruce stump and ex emergence trap over dead wood (Jakovlev 2011, Finland). Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Zygomyia pseudohumeralis* Caspers, 1980**

Distribution. Common throughout Britain; three scattered Irish records. Widespread in Europe.

Habitat. Woodland.

Biology. Unknown. Jakovlev (2011) reported that it had been obtained in an emergence trap over dead wood in Finland.

***Zygomyia semifusca* (Meigen, 1818)**

Distribution. Frequent throughout Britain; three Irish records (Lough Conn, Co Mayo, 1985; Crom Castle Estate, Co Fermanagh, 1992; Shanavaur Wood, Co Laois, 2010). Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. Unknown. Jakovlev (2011) reported that it had been obtained in an emergence trap over dead wood in Finland, and Deady (2012) obtained it in emergence traps over brash in conifer plantations in Ireland.

***Zygomyia valeriae* Chandler, 1991**

Distribution. Frequent throughout Britain; a few scattered Irish records (4 hectads). Widespread in Europe.

Habitat. Woodland.

Biology. Unknown.

***Zygomyia valida* Winnertz, 1864**

Distribution. Common throughout Britain and Ireland, also in Jersey. Widespread in Europe, also in N Africa and the Atlantic islands.

Habitat. All types of woodland, woodland edge and open habitats.

Biology. Unknown.

***Zygomyia vara* (Staeger, 1840)**

Distribution. Common throughout Britain and Ireland, also in Jersey. Holarctic, widespread in Europe.

Habitat. Woodland.

Biology. No British records. Other records: reared from larvae under bark of a decaying fallen branch of *Sorbus* bearing numerous fruiting bodies of *Sclerencoelia fascicularis* and obtained in an emergence trap over dead wood (Jakovlev 2011, Finland).

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